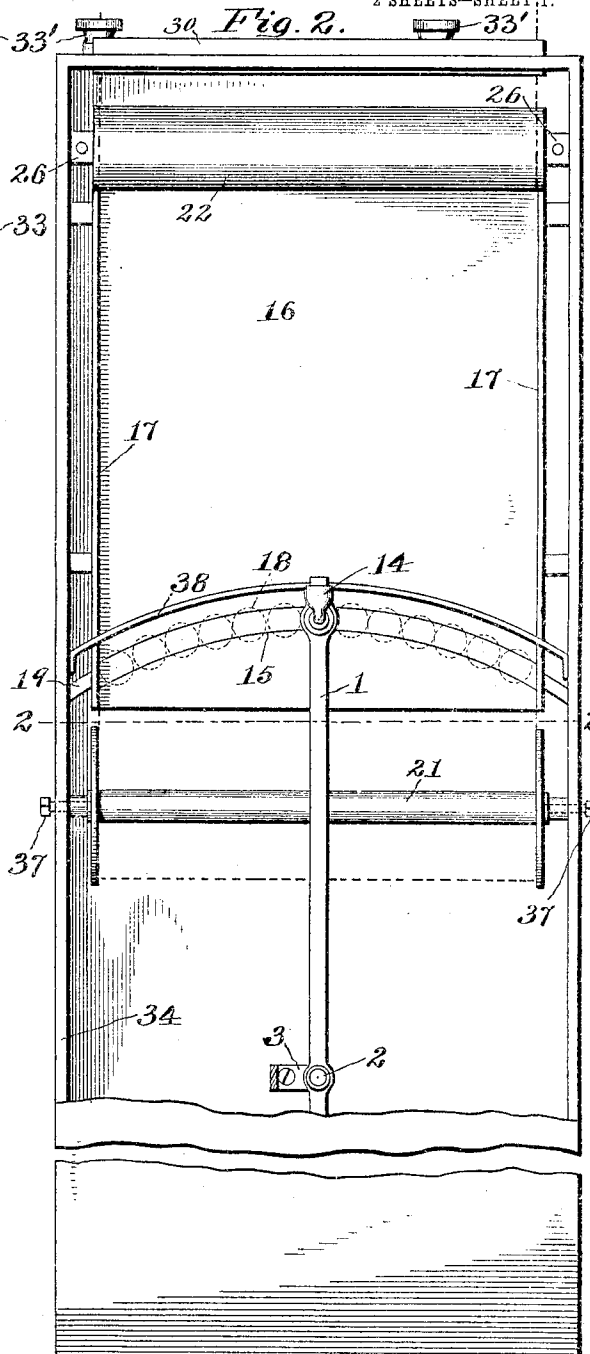
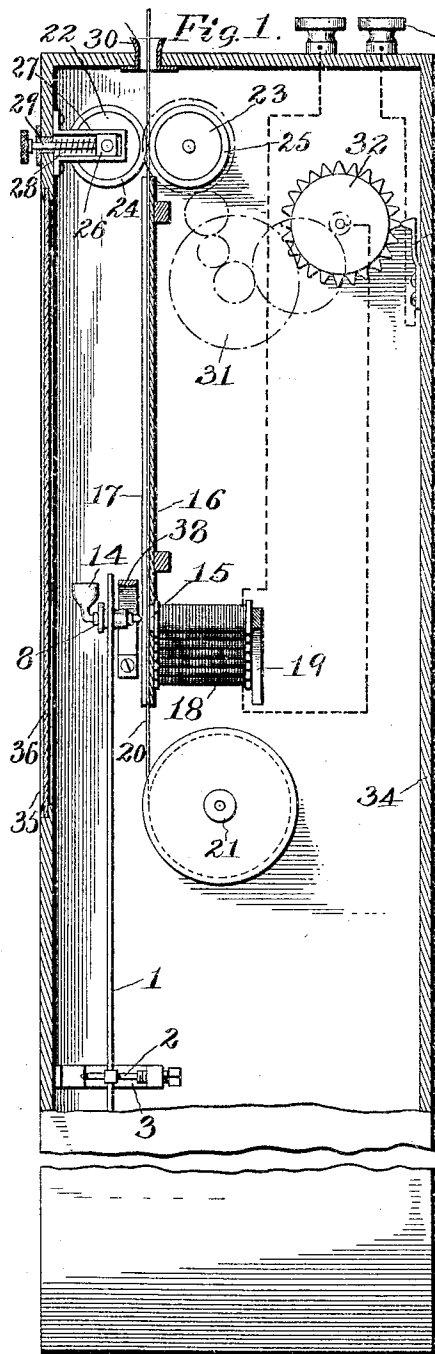


No. 807,518.

PATENTED DEC. 19, 1905.

C. E. VAWTER, JR.
RECORDING INSTRUMENT.
APPLICATION FILED JULY 25, 1905.

2 SHEETS—SHEET 1.



Witnesses
Geo. A. Byrnes.
W. J. Schornborn

Inventor
C. E. Vawter, Jr.
by *John H. Volk*
his Attorney

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2 SHEETS—SHEET 2.

Fig. 3.

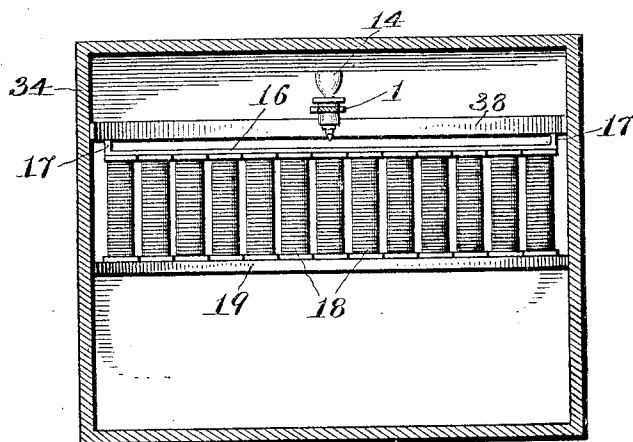


Fig. 4.

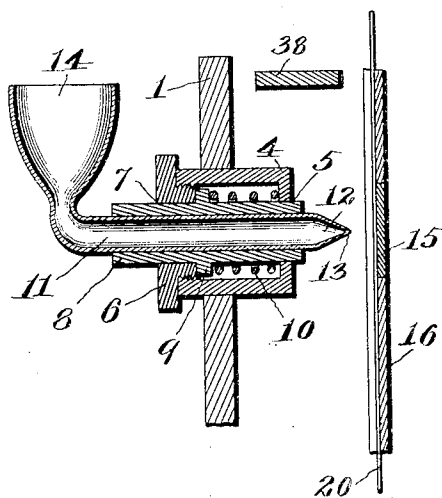
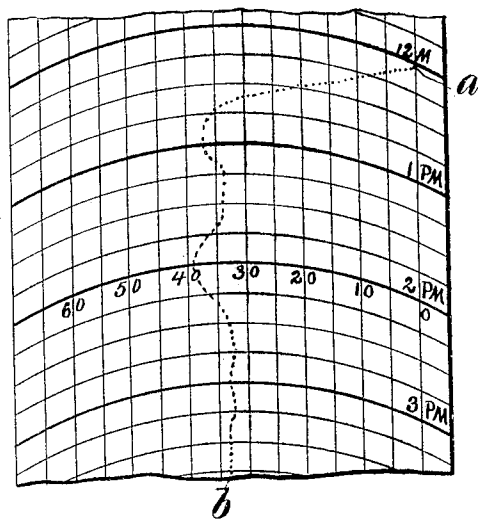


Fig. 5.



Witnesses

Geo. A. Bepue.
W. T. Schornborn.

Inventor

C. E. Vawter, Jr.
by *John H. Nalt* Attorney

UNITED STATES PATENT OFFICE.

CHARLES E. VAWTER, JR., OF BLACKSBURG, VIRGINIA.

RECORDING INSTRUMENT.

No. 807,518.

Specification of Letters Patent.

Patented Dec. 19, 1905.

Application filed July 25, 1905. Serial No. 271,234.

To all whom it may concern:

Be it known that I, CHARLES E. VAWTER, JR., a citizen of the United States, residing at Blacksburg, in the county of Montgomery and State of Virginia, have invented certain new and useful Improvements in Recording Instruments, of which the following is a specification.

This invention relates to improvements in recording instruments, such as voltmeters, ammeters, wattmeters, thermometers, and, indeed, any recording instrument having an index arranged to move over a record-sheet or the like.

The objects of this invention are to produce a recording instrument wherein the mechanical act of producing the record does not interfere with the accuracy of the instrument or impair its delicacy; wherein the record is at all times visible; wherein the record-sheet is not punctured nor injured by the recording-point; wherein the record-sheet after passing the recording-point may be cut off in desired lengths, and, finally, to produce an instrument of the kind described which shall be simple and not liable to get out of order.

With the above objects in view the said invention consists in the novel combination and arrangement of parts hereinafter described, and more particularly pointed out in the accompanying claims.

In order to more fully describe my invention, reference will be had to the accompanying drawings, which illustrate one form thereof, and wherein—

Figure 1 represents a central vertical section through the upper portion of the containing-case, showing the lower portion thereof broken away and the parts within said casing forming the subject of this invention partly in elevation and partly in section; Fig. 2, a front elevation of the parts forming the subject-matter of this invention and showing the containing-case broken away near its lower end and having its upper front portion removed; Fig. 3, a section through the containing-case, taken on the line 2 2, Fig. 2, showing the interior parts in elevation; Fig. 4, an enlarged detail sectional view through the recording-head of the index and related parts, and Fig. 5 is a top plan view of a portion of the record-sheet.

Similar parts are indicated by similar numerals throughout the several views.

1 represents the movable index or pointer of a recording instrument—such as a recording voltmeter, ammeter, wattmeter, or the like—pivoted, as at 2, in a suitable bracket 3. This index is preferably of non-magnetic metal and carries near its free end a cylinder 4, also of non-magnetic metal. One end of this cylinder has an opening 5 therethrough, and the other end is closed by a screw-threaded plug or cap 6, having a central opening 7 therethrough. (See Fig. 4.) Extending for movement through the openings 5 and 7 and through the cylinder 4 is an armature 8, of soft iron, having a collar or annular flange 9 inside of the cylinder 4. The portion of the armature 8 within the cylinder 4 carries a small coil-spring 10, which engages at one end the flange 9 and at the other end the head of the chamber 4, thereby normally forcing the armature in the direction of the screw-cap 6.

Extending longitudinally through the armature 8 and made fast thereto is a glass ink-tube 11, terminating at one end in the contracted pointed portion 12, which is provided with a small orifice 13. Upon the other end of the tube 11 is formed an ink-receptacle 14.

The tube 11, which I shall hereinafter designate the "record-pen," and the armature 8 of the index are arranged to move over a soft-iron magnet pole-piece 15, which extends through and flush with the top surface of a guide-plate 16, having side flanges 17. Secured to the pole-piece 15 are a number of electromagnets 18, connected in series, though obviously one pole-piece and one magnet-coil may be substituted for the plurality of magnets shown. These magnets 18 may be supported in any suitable way, as upon a cross-piece 19.

Between the recording-pen and the pole-piece 15 passes the record-sheet 20. This record-sheet is wound upon a spool 21 and passes from said spool over the guide-plate 16, its edges engaging the side flanges 17 of said plate, and passes thence between two rollers 22 and 23, each of which may be covered with suitable rubber coverings 24 25. Suitable pressure between the rollers 22 and 23 may be secured in any desired way. As a means for securing this pressure I have shown the roller 22 mounted in movable bearings 26, carried in frames 27 and normally under the tension of springs 28. The rods 29 are movable with the bearings 26 and merely act as guides for

the springs. After passing between the rollers 22 23 the record-sheet is adapted to pass upward through an opening 30. By means of this arrangement the record-sheet may be cut
5 off in desired lengths as it passes from the instrument.

The desired motion is imparted to the record-sheet by power applied to the roller 23 from a clockwork 31, suitably geared thereto,
10 or from any other desired source. The clockwork 31 also drives a serrated wheel 32, which, together with a spring-contact 33, forms a make-and-break device which is connected in circuit with the electromagnets 18, as shown.
15 The terminals of this circuit may lead to binding-posts 33' for connection to a suitable source of current-supply.

The record-sheet is laid off in straight lines parallel to its sides, which indicate the quantities to be measured, and in transverse lines to indicate time intervals. (See Fig. 5.) The sheet shown in this figure is divided lengthwise into hours and quarter-hours and crosswise in steps of five in the quantities to be
25 measured. The dotted line *ab* represents the record as made on the sheet by the instrument.

The working parts of the instrument are carried within a containing-case 34, having a front opening 35, covered by a glass 36 or
30 other transparent covering, through which the record may be readily seen. Fresh record-sheets may be readily placed in the instrument by loosening screws 37 and taking out the empty spool and placing the fresh spool in
35 its place, or a fresh roll of the record-sheet may be merely slipped over the core of the empty spool, in which event one of the ends of the spool would have to be removable.

The operation is as follows: The record-sheet is fed along in front of the recording-pen at any desired speed by the clockwork, as described. At the same time the teeth of the serrated wheel 32 are rotated past the spring-contact 33, making and breaking the
45 circuit of the electromagnets 18. As the recording-pen moves over the face of the record-sheet the armature 8, by which the said pen is carried, will be intermittently attracted toward the record-sheet by the electromagnets and sprung away therefrom by the spring
50 10, causing the record-line to appear in the form of a line of dots, as shown in Fig. 5, the frequency of said dots depending upon the rate of rotation of the make-and-break contact-wheel 32 and the number of teeth thereon.
55 The angular movement of the index 1, as is common in recording instruments of this class, indicates the quantity measured, while the record-line measured in the direction of the length of the sheet indicates the time. As the sheet is fed along past the recording-head of the index it is fed through the opening 30 at the top of the instrument, where, as above pointed out, it may be cut off in suitable
65 lengths, if desired.

In order to limit the downward movement of the index 1 when its head is drawn down by the magnets, I provide a cross-piece 38, extending across the case of the instrument just beneath the free end of the index.
70

Having thus described my invention, what I claim is—

1. In a recording instrument, the combination with a movable index having one point of support and a free end, of an armature
75 movably mounted thereon at said free end, a recording-point operatively connected to said armature, an electromagnet over which said armature is arranged to travel, a make-and-break device located in circuit with the windings of said magnet, a record-sheet adapted to be engaged by said recording-point only when said armature is attracted by said magnet, and mechanism to impart movement to said record-sheet and to operate said make-and-break device, substantially as described.
85

2. In a recording instrument, the combination with a movable index having one point of support and a free end, of an armature
90 movably mounted thereon at said free end, a fountain-pen operatively connected to said armature, a record-sheet in proximity to said fountain-pen, electromagnetic means for intermittently attracting said armature whereby said fountain-pen is brought into contact
95 intermittently with said record-sheet, a stop to limit the motion of said index in the direction of said record-sheet, and means to impart motion to said record-sheet, substantially as described.
100

3. In a recording instrument, the combination with a movable index having one point of support and a free end, of an armature movably mounted thereon, a fountain-pen carried
105 by said armature, an electromagnet over which said armature is arranged to travel, a make-and-break device located in circuit with the windings of said magnet, a record-sheet adapted to be engaged by said fountain-pen only when said armature is attracted by the said
110 magnet, a stop to limit the motion of said index in the direction of said record-sheet, and mechanism to impart movement to said record-sheet and to operate the make-and-break device, substantially as described.
115

4. In a recording instrument, the combination with a movable index, of an armature movably mounted thereon, a spring normally forcing said armature in one direction, a tube made fast to and passing through said armature and terminating at one end in a contracted
120 portion through which extends an orifice and terminating at its other end in an ink-receptacle, a record-sheet in proximity to the contracted portion of said tube, an electromagnet
125 over which the said armature is arranged to travel, a make-and-break device located in circuit with the windings of said magnet, means to limit the motion of said index in the direction of said record-sheet, and mechanism to
130

impart movement to said record-sheet and to operate said make-and-break device, substantially as described.

5 In a recording instrument, the combination with a movable index having one point of support and a free end, of an armature mounted thereon, a fountain-pen carried by said armature, a record-sheet located in proximity to said fountain-pen, a roller upon which said
10 record-sheet is wound, a guide-support over which said record-sheet is arranged to pass, said rollers arranged to engage the sides of said record-sheet to impart motion thereto, an inclosing case for the above-mentioned parts
15 having an opening through which the free end of said record-sheet is arranged to be fed, an opening covered by transparent material

through which the record-sheet may be read as the record is being made, an electromagnet over which the said armature is arranged to
20 travel, a make-and-break device connected in circuit with the windings of said magnet, a stop to limit the motion of said index in the direction of said record-sheet, and mechanism
25 for operating the said sheet-rollers and said make-and-break device, substantially as described.

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

CHARLES E. VAWTER, JR.

Witnesses:

WM. C. ELLETT,

C. L. PEDIGO.