

F. S. BALDWIN.
Electrical Anemometers.

No. 140,340.

Patented July 1, 1873.

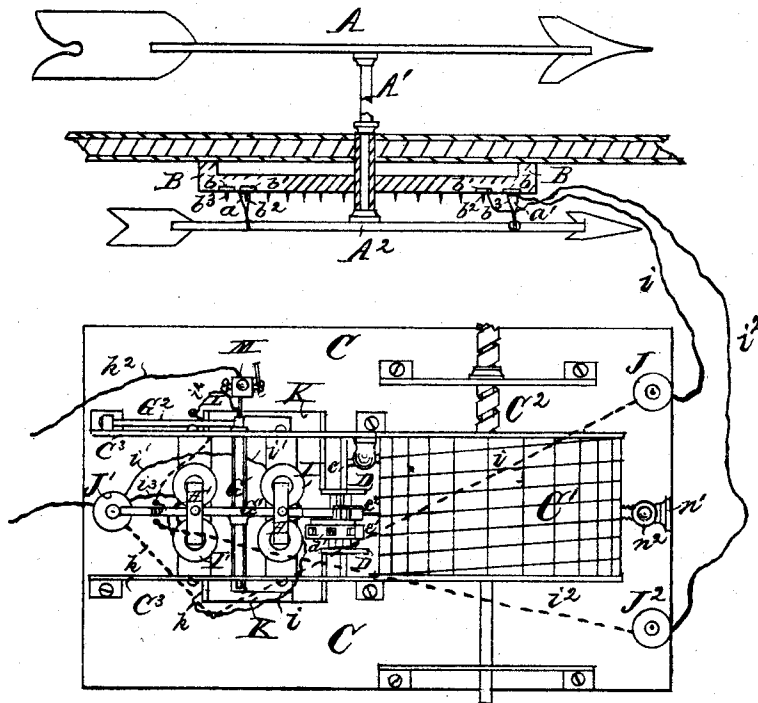


FIG. 1.

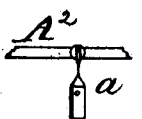


FIG. 3.

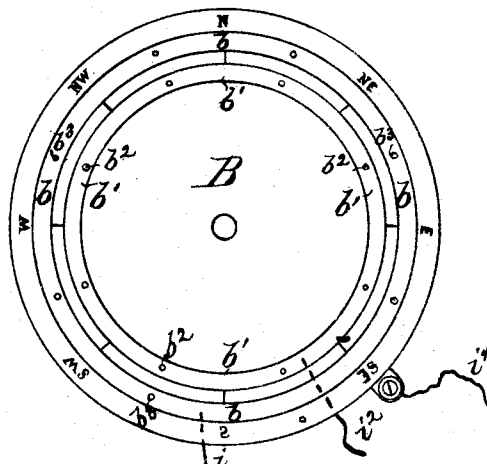


FIG. 2.



FIG. 4.

WITNESSES:

Ch^{rs} Rousseau
Chas Meisner

INVENTOR:

Frank S. Baldwin
per. *Kerthel & Co*

Attys.

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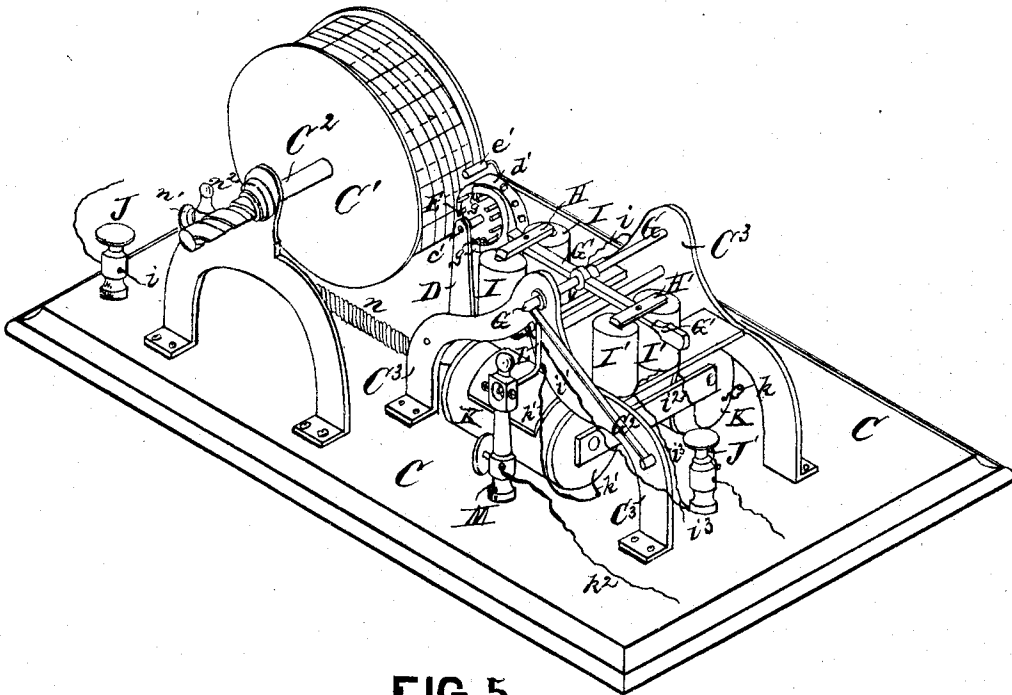


FIG. 5.

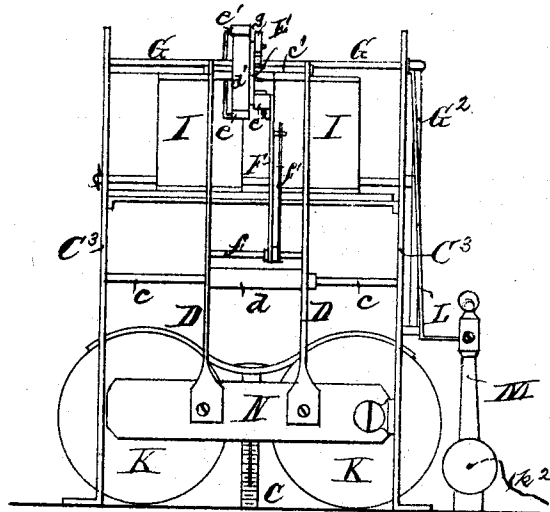


FIG. 6.

WITNESSES:

Ch^r Proussau
Ch^r Meunier.

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Frank S. Baldwin
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UNITED STATES PATENT OFFICE.

FRANK S. BALDWIN, OF ST. LOUIS, MISSOURI.

IMPROVEMENT IN ELECTRICAL ANEMOMETERS.

Specification forming part of Letters Patent No. **140,340**, dated July 1, 1873; application filed April 21, 1873.

To all whom it may concern:

Be it known that I, FRANK S. BALDWIN, of St. Louis, in the county of St. Louis and State of Missouri, have invented an Improved Electric Apparatus for Registering the Directions of the Winds, of which the following is a specification:

This invention is designed not only to measure the velocity of the winds, as ordinarily accomplished, but specially to accomplish the new purpose of registering the direction of the winds in all changes, veerings, and the like. My invention therefore consists, first, in the application, use and operation of insulated metallic plates, either in direct connection with the weather-vane or its horizontal operating-vane; and in the further application and use of metallic circles having points, said circles being insulated from each other and arranged in combination with the dial with circuit connections to battery and electric apparatus. Second, to an improved construction of the electro-magnetic registering machine, and providing same with a type-wheel or similar device; and the manner of operating same to print, annotate, or register the veerings of the wind in accordance with the motions of the weather-vane, and also at the same time and within the same space, the velocity of winds occurring.

To enable those herein skilled in the art to make and use my said improvements, I will now more fully describe the same, referring to—

Figure 1, Sheet 1, as a top plan of registering apparatus with circuit connections to dial-plate, which, together with lower vane, is shown in section, attached to the ceiling, the weather-vane proper being shown as operating without the building. Fig. 2, Sheet 1, is a plan of dial with compass-card; Figs. 3 and 4, Sheet 1, as respective detail views of the metallic plates. Fig. 5, Sheet 2, represents a perspective view of the registering apparatus; Fig. 6, Sheet 2, being an end elevation with cylinder removed.

Ordinarily, the weather-vane, by its shaft, connects with a horizontal shaft or vane, the latter being arranged, together with a dial-plate having compass-card, at the top of the ceiling of a room, while the weather-vane proper is at the top of the building; the arrangement

in this manner being such that the lower vane operating in the room shall indicate the compass-points by its movements, which are in accordance with the vane top of building. Or, as readily apparent, so much of the apparatus consisting of the vane, dial, and its parts can be arranged outside the top of building, all said parts save the vane being properly incased so as not to be exposed to the inclemencies of the weather.

In either case, A represents the weather-vane; A¹, vertical shaft; A², horizontal lower shaft or vane; B, the dial-plate having compass-card, shown in Fig. 2. The lower vane A² I provide with metallic plates *a a'*, each insulated on one side. The plates *a a'* can be of a delicate tension or spring formation, as shown at *a*, Fig. 3, attached to vane A², or of a more rigid formation, and pivoted to said vane, as in the case of *a'*, Fig. 4. Further, the arrangement of the plates *a a'* on their vane is such as to allow a lateral movement in line with same, being so placed, and said plates being set at such an angle, that one of said plates shall establish circuit connections by the revolving action of the weather-vane in one direction, the other plate establishing similar circuit connection by the revolving action of the vane in an opposite direction, and vice versa, in accordance with the veerings of the wind. To establish circuits required by the contact of either of the plates *a a'*, I provide in line with same metallic circles *b b'*, which are made to form part of dial B. Further, the circles *b b'* have projecting points *b² b³*, which are arranged midway between the radial points of the compass, more clearly shown in Fig. 2. When, therefore, the vane A² revolves in one direction, the metal side of the plate *a* will come in contact with the points *b²* of circle *b'*, while at the same time the insulated side of the plate *a'* will come in contact with points *b³* of circle *b*. In case the vane revolves in an opposite direction the contact of the plates with points will be reversed. Further, the circuit connections from both circuits or circles *b b'* are established with the battery and register apparatus, as will hereinafter more fully appear. C is the base of the machine. The base C is provided with a revolving cylinder, C¹, properly supported in operative connection

with the electro-magnetic apparatus. The cylinder C^1 is operated by clock-work to make a certain number of revolutions in twenty-four hours, being carried along in the direction of its length as it revolves by its screw-threaded shaft C^2 . Upon the circumference of cylinder C^1 a paper is placed having ruled spaces corresponding to the number of its revolutions, being divided into twenty-four equal parts, representing the hours of the day, and said spaces are again subdivided into half-hours, quarters, &c., as desired. The arrangement, construction, and operation of cylinder C^1 is, therefore, as ordinary. C^3 are metallic side frames to support the operating mechanism. D is a swinging frame. This is provided with a sleeve-shaft, d , so as to support and allow said frame to turn on a transverse shaft, c , Fig. 6. On a shaft, c' , having its bearings in the top of the swinging frame D is provided a type-wheel, d' . Alongside of type-wheel d' , and firmly fixed on its shaft, is a lantern-wheel E . Further, secured to one side of swinging frame D is provided the upper and lower printing-rollers $e e'$, which distribute ink upon the type-wheel as it revolves. The type-wheel d' is held in operative position by a roller, e^2 , which engages the lantern-wheel E , Fig. 6. The roller e^2 turns the top of a vibrating arm, F , which is journaled to a separate shaft, f , having its bearings in the frame D . To return the roller e^2 to operative position, a detent-spring, f' , is provided, the lower end of which is secured to the sleeve-shaft d , while the upper end of said spring engages a projecting pin alongside of arm F . (See Fig. 6.)

The improved construction of the electro-magnetic machine to operate the swinging frame and its devices is as follows: At the top of the frames C^3 turns a rock-shaft, G . This carries the clutch-lever G^1 . The lever G^1 is so constructed and arranged that its clutches $g g'$ shall engage the lantern-wheel E . (See Fig. 5.) The clutch-lever G^1 has secured thereto the respective armatures $H H'$, so as to be operated by the upright magnets $I I'$. The magnets $I I'$ are supported properly in the frame of the machine. The magnets I connect, by their positive wire i , to a binding-screw, J ; from thence to the circle b , or outside circuit of dial, more clearly shown in Fig. 1. The negative wire i^1 of the magnet I being connected to a binding-screw, J^1 ; from thence to the negative pole of the battery. Similarly the magnet I' has its positive wire i^2 connected to a binding-screw, J^2 ; from thence to the circle b^1 , or inside circuit of dial. (See Fig. 1.) The negative wire i^3 of the magnet I' being connected to binding-screw J^1 ; from thence to the negative pole of battery. The lower vane A^2 has its wire i^4 connected to the positive pole of battery direct. The circuits being thus formed, in case therefore the clutch-lever G^1 is depressed by the action of the armature H , the clutch g engages the lantern-wheel E ; but if the armature H' causes the clutch-lever G^1 to be raised or elevated, its

lower clutch g' is brought in engagement with the wheel E ; and in this manner the type-wheel d' is acted upon preparatory to being rotated in either direct or reverse revolutions. To return the clutch-lever G^1 to original position, a suitable spring, G^2 , is provided, one end thereof being attached to the rock-shaft G , the other end properly to the side frame. In order, at the same time that the clutch-lever G^1 is operated, to engage the wheel E , and to cause the type-wheel d' to partly revolve, this is achieved by actuating the swinging frame D in the direction of the cylinder C^1 by the additional magnet K and its circuit connections, as follows: The magnet K rests upon the base C of the machine, properly secured in horizontal position. (See Figs. 1 and 5.) The negative wire k of the magnet K also connects with the negative pole of the battery by means of the binding-screw J^1 . The positive wire k^1 of the magnet K connects to a vibrating lever, L , by means of frame C^3 . This lever is journaled on the rock-shaft G , its lower end being bent and fitted to engage a binding-screw, M . (See Fig. 5.) The binding-screw M is provided with set-screws to regulate the action of the lever L . From said screw M the positive wire k^2 connects to battery.

The circuit with binding-screw M , it will be noticed, is interrupted, and, therefore, as long as the lever L is not acted upon by the rock-shaft G , the circuit connections of magnet K is arrested. On the other hand, as soon as the clutch-lever G^1 is elevated or depressed, the circuit of the magnet K is completed by the connection of the lever L to the positive pole of the battery.

The magnet K attracts an armature, N , which is attached to the swinging frame D , (see Fig. 6,) and thus operates said frame to present its type device to the face of the cylinder C^1 . The frame D , after being operated by the magnet K , is returned to place by the action of a light spring, n , one end of which connects to the armature N , the other end to a regulating-screw, n^1 , operating in a bearing-screw, n^2 , as indicated in Fig. 5.

The combined operation of the electro-magnetic apparatus is, therefore, as follows: The type-wheel d' is placed with its letters corresponding to the positions of the weather-vane opposite the cylinder C^1 . In case the vane A^2 is rotated until the metallic plate a' comes in contact with any of the points b^3 , a circuit will be formed from the positive pole of the battery through said shaft A^2 , plate a' , points b^3 , and the wire i , binding-screw J , magnet I , binding-screw J^1 , to the negative pole of the battery. The magnet I , thus becoming magnetized, attracts the armature H , depressing the lever G^1 , so that its clutch g engages the wheel E , and in doing so brings the vibrating lever L in contact with the binding-screw M , thus completing the circuit through magnet K , which at the same time attracts its armature N to actuate the swinging frame D , which movement results in partly rotating

the type-wheel d' in the direction of the cylinder C^1 , upon which it leaves its imprint of the direction which the weather-vane without has moved, or, the same thing, the direction of the wind acting said vane. As soon as the metallic plate a' passes the point b^3 , the circuit connection being broken, the clutch-lever G^1 is returned to its horizontal position by its spring G^2 , and in turn causing the lever L to return to original position, thus breaking the circuit with the magnet K , which releases the armature N ; and in doing so the swinging frame D is returned to place by the spiral spring n . In case the vane A^2 is revolved in the opposite direction, a circuit is formed in similar manner by means of the metallic plate a , in contact with any of the points b^2 , through the wire i^2 , magnet I' , which attracts the armature H' , elevating the lever G^1 so that its clutch g' engages the lantern-wheel E , and in doing so brings the vibrating lever L in contact with the binding-screw M , thus completing the circuit through the magnet K , which attracts the armature N , actuating the swinging frame D , which movement results in partly rotating the type-wheel d' (in opposite direction to that last described) to the direction of cylinder C^1 , with the same advantageous results of registering the direction.

It is thus apparent that it matters not which way are the changes of the wind or its veerings, and the like action upon the weather-vane, the direction of all said occurrences are simultaneously registered.

Having thus fully described my said improvements, what I claim is—

1. In combination with the indicating-arm A^2 of the wind-vane, the metallic plates a a' insulated on one side, constructed and ar-

ranged to form electrical contact as the arm moves in one direction, but not when it moves in the opposite direction, substantially as and for the purpose set forth.

2. In combination with the dial B of the wind-vane, the metallic circles b b^1 , having projecting points b^2 b^3 , for operating with the moving plates a a' , substantially as and for the purpose set forth.

3. The moving plates a a' and projecting points b^2 b^3 , respectively connected by circuit-wires with the magnets I I' , and their armature clutch-lever G^1 , substantially as and for the purpose set forth.

4. The combination of a type-wheel, d' , lantern-wheel E , roller e^2 , arm F , spring f , and swinging frame D with the clutch-lever G^1 and electro-magnets I I' , for printing on the recording-cylinder C^1 , substantially as and for the purpose set forth.

5. The swinging frame D and its type devices, as described, armature N , in combination with magnet K and its circuit connections, as and for the purpose set forth.

6. The magnet K , binding-screw M , vibrating lever L , in combination with rock-shaft G , as and for the purpose set forth.

7. The arrangement of the swinging frame D and its type devices, armature N , magnet K , lever L , binding-screw M , in combination with either circuits formed by the magnets I I' , substantially as shown and described.

In testimony of said invention I have hereunto set my hand.

FRANK S. BALDWIN.

Witnesses:

WILLIAM W. HERTHEL,
J. W. HERTHEL.