(No Model.)

4 Sheets—Sheet 1.

H. J. HAIGHT.

WIND VANE INDICATOR.

No. 420,057. Patented Jan. 28, 1890.

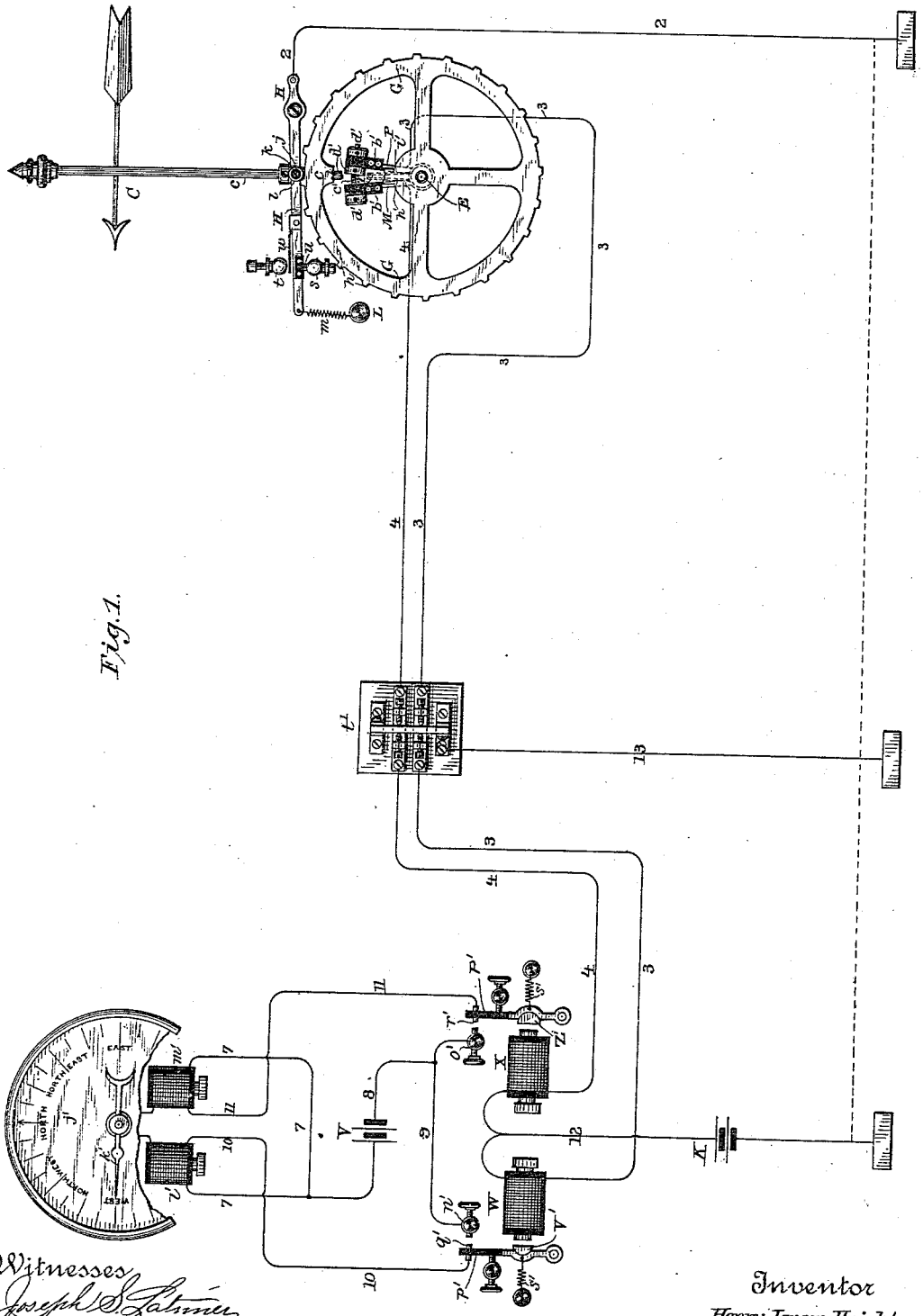

Fig. 1.

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(No Model.) 4 Sheets—Sheet 2.

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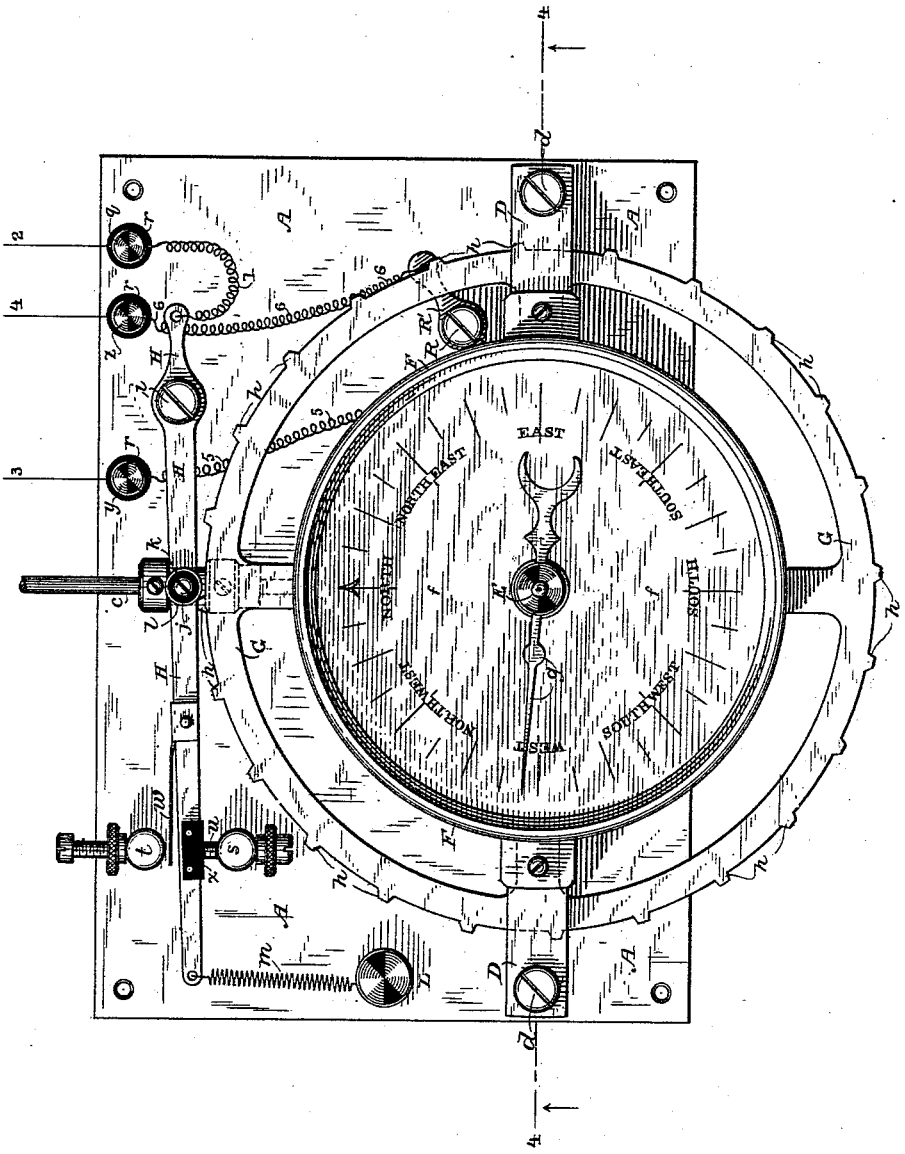
Fig. 2.



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(No Model.)

4 Sheets—Sheet 3.

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WIND VANE INDICATOR.

No. 420,057. Patented Jan. 28, 1890.

Fig. 3.

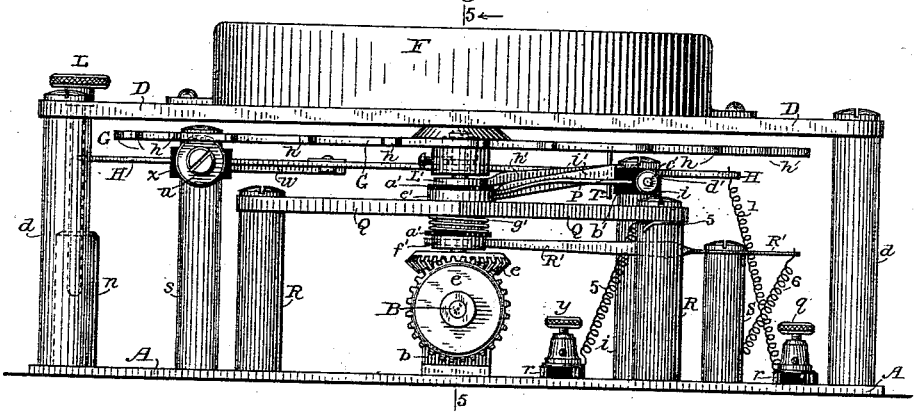


Fig. 4.

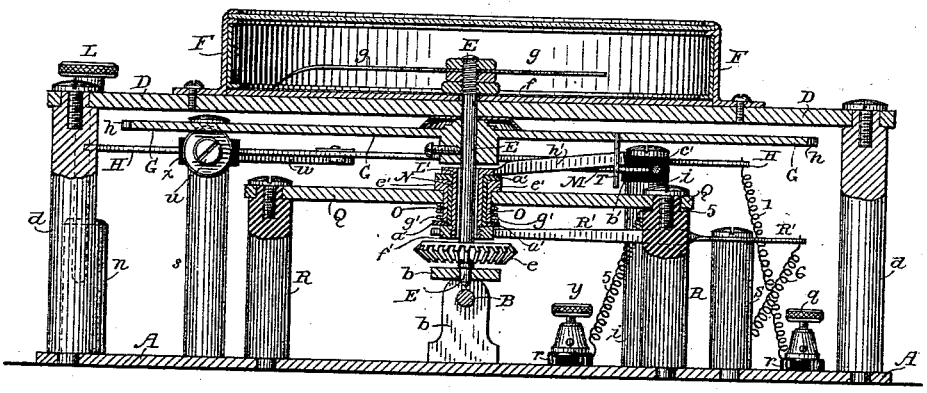
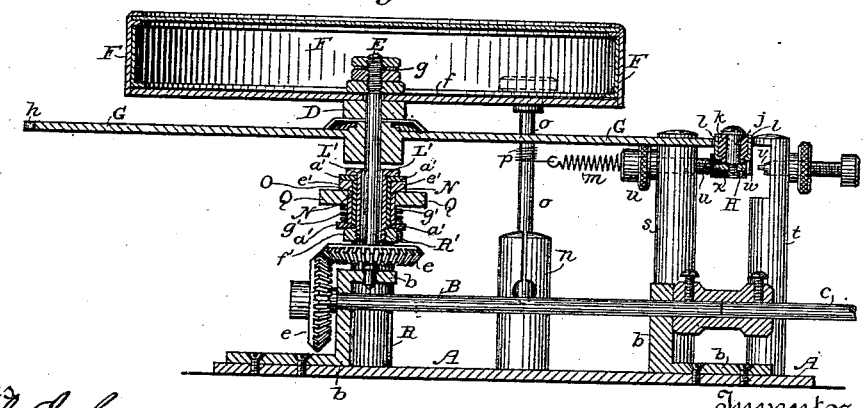


Fig. 5.



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(No Model.) 4 Sheets—Sheet 4.

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WIND VANE INDICATOR.

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Fig. 6.

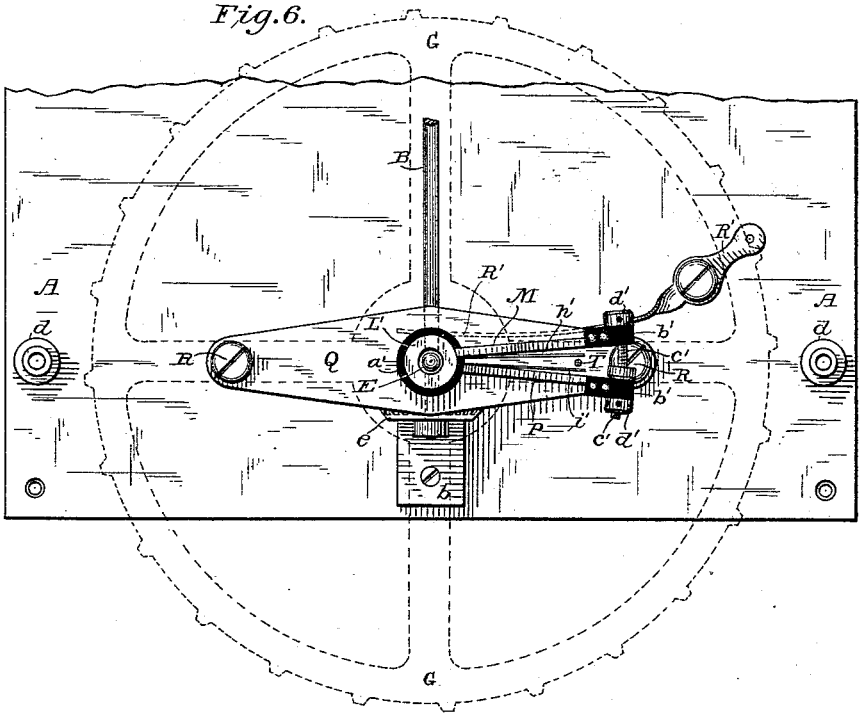
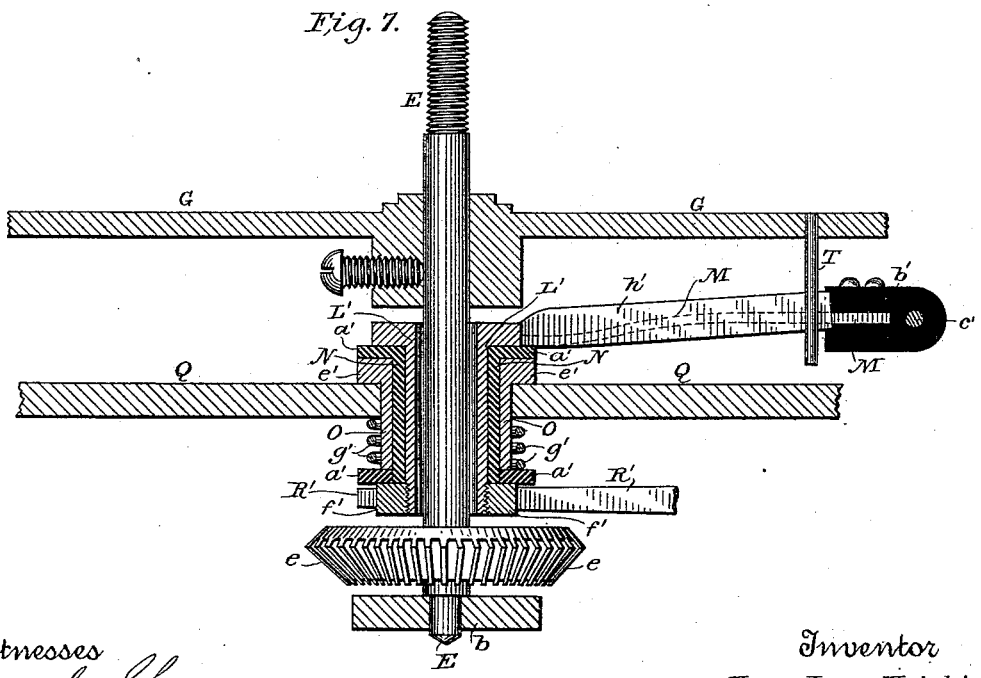


Fig. 7.



Witnesses
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Carleton E. Snell.

Inventor
Henry Jansen Haight

By his Attorney
Arthur L. Brown

UNITED STATES PATENT OFFICE.

HENRY JANSEN HAIGHT, OF NEW YORK, N. Y.

WIND-VANE INDICATOR.

SPECIFICATION forming part of Letters Patent No. 420,057, dated January 28, 1890.

Application filed August 23, 1889. Serial No. 321,720. (No model.)

To all whom it may concern:

Be it known that I, HENRY JANSEN HAIGHT, of the city, county, and State of New York, have invented certain new and useful Improvements in Wind-Vane Indicators, of which the following is a specification.

The object of this invention is to provide for the transmission by electric means of wind-vane indicators from the place where the wind-vane is located to a distant station or stations.

In carrying out the objects of this invention there are employed a transmitting-instrument at the place or station where the wind-vane is located, a receiving indicating-instrument at each distant receiving-station, and intermediate electric connections.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a view in the nature of a diagram showing the transmitting-instrument, one receiving indicating-instrument, and their electric connections. Fig. 2 is a face view of the transmitting-instrument. Fig. 3 is an under side view thereof. Fig. 4 is a section in a plane indicated by the line 4 4 in Fig. 2. Fig. 5 is a section in a plane indicated by the line 5 5 in Fig. 3. Fig. 6 is a detail plan view of a portion of the transmitter, the casing containing the dial-scale and its supports being removed; and Fig. 7 is a sectional view, on an enlarged scale, of a portion of the mechanism shown in Fig. 4.

The transmitting-instrument will be first described in detail. This instrument is composed, mainly, of metal, thus necessitating the insulation of the various parts which comprise portions of the electric circuits. The various operative parts of this transmitting-instrument are mounted upon a metallic base-plate A, which may be secured to any convenient support. To this base-plate are secured two metallic bearing-brackets *b b*, Fig. 5, in which is journaled an arbor B, to which is coupled the rotary shaft *c* of the wind-vane C.

To the plate A are secured two metallic posts *d d*, which support a metallic cross-bar D, extending crosswise of the arbor B.

Journaled in one of the brackets *b* and the cross-bar D is the indicating index-arbor E, extending at right angles to the driving-arbor B and driven thereby by bevel-gears *e e*.

To the outer side of the cross-bar D is secured a casing F, inclosing a scale *f*, marked with the points of the compass, and an index *g*, which is carried on the end of the arbor E.

On the arbor E, immediately behind the cross-bar D, is secured a metallic circuit-closing wheel G, carrying on its periphery a series of circuit-closing projections *h h*, corresponding in number with the divisions on the indicating-scale. Co-operating with this circuit-closing wheel is a metallic circuit-breaking lever H, which is pivotally connected to a post *i*, of insulating material—such as hard rubber—secured to the base-plate. This circuit-breaking lever has a stud *j*, surrounded by an insulating-sleeve *k*, of hard rubber, and on this sleeve turns a bowl *l*, which is thus insulated from the lever H. This bowl is drawn into co-operative relation with the projections *h h* on the wheel G by a spring *m*, which is attached at opposite ends to the long end of the lever H and to a tension-regulator L. This tension-regulator consists of a metallic post *n*, Fig. 5, carried by the base-plate, in the upper split end of which turns a shaft *o*, to which is attached an insulating silken cord *p*, which is secured to the spring. By turning the shaft *o* the cord is wound or unwound, thus regulating the tension of spring *m*. The cord being made of insulating material there is no direct electrical connection between the post *n* and lever H. The short end of lever H is connected by an insulating-wire 1, Figs. 2, 3, and 4, to a binding-post *q*, secured by a hard-rubber base *r* to the base-plate A. From this binding-post a circuit-wire 2 leads to one pole of a battery K. Part of the circuit-wire 2 may be replaced by an earth-connection if the battery is located at a distance, as indicated in Fig. 1. The long end of the lever H plays between two metallic posts *s t*, secured to the base-plate. The inner post *s* carries an adjustable stop *u* and the outer post *t* carries an adjustable contact *v*, Fig. 5. The lever is provided with a spring-contact *w*, co-operating with the contact *v*, and a hard-rubber back piece *x*, co-operating with the stop *u*. Normally the back piece *x* is held against

the stop u by the spring m, with the spring-contact w and fixed contact v separated. When, however, a circuit-closing projection h on the circuit-closing wheel G comes in contact with the bowl l on the circuit-breaking lever, the contacts w v are brought together, thus establishing electric connection between the battery and the base-plate and all parts in metallic connection therewith, including the index-arbor E and the wheel G. When the projection h is carried out of contact with the bowl, the electric connection is broken by the spring m. At every point of the compass, therefore, (the number of points being determined by the number of projections h,) to which the wind shifts an electric circuit will be made and again broken. This making and breaking of an electric circuit is utilized for the transmission of the wind indications to a distant station.

Since the wind may shift in either direction, so that the circuit-closing wheel G may be rotated either one way or the other, it is necessary to connect the transmitting-instrument with the receiving-indicator by two circuit-wires 3 and 4, in addition to the wire 2, one of said wires 3 or 4 being in circuit when the wheel G turns in one direction, and vice versa. Consequently mechanism is necessary for bringing one wire into the circuit and cutting out the other wire, in accordance with the direction in which the wheel G is moving. The two circuit-wires 3 and 4 are respectively connected to binding-posts y and z, which are secured by hard-rubber bases r to the base-plate A.

Concentrically encircling, but not in contact, with the arbor E, between the wheel G and bevel-gear e, is a metal collar L′, carrying a radially-extending metal arm M in a plane parallel with that of the wheel G as shown best in Fig. 7. The collar L′ is in turn encircled by a hard-rubber sleeve N, and exterior to this is a second metallic collar O. This metallic collar O is further insulated from parts above and below by hard-rubber washers a' a', one of which may be integral with the sleeve N. This metallic collar O, which is also concentric with arbor E, also carries a radially-extending metal arm P, Figs. 3 and 6, in a plane parallel with that of the wheel G. The two arms M and P are not in the same vertical plane, but are separated slightly by a small arc from each other. Their relative positions are fixed by their outer ends being secured together, but insulated from each other. Each carries on its outer end a hard-rubber block b', and the two blocks are adjustably fastened by a screw-threaded connecting-rod c' and thumb-nuts d'.

The collars L′ and O are rotatively mounted so as to rotate around the arbor E by being journaled in a central aperture in a metallic cross-bar Q parallel with the cross-bar D. The cross-bar Q is supported by its ends resting on two hard-rubber pillars R R on the base-plate. The outer collar O is slipped through the central aperture in the bar Q, an annular flange e' on the collar O resting in contact with the bar. A circular nut f', screwed to the inner collar L′, holds the parts in position. The two collars can thus turn freely in the bar Q; but they are held in any position in which they may be left, and are prevented from slipping by a coiled spring g', interposed between the hard-rubber washer a' and the bar Q. The radial arms M P are thus insulated from each other and from all parts in metallic connection with the base-plate A, and they are free to turn concentrically with the circuit-closing wheel G and in either direction.

The two collars L′ O and their intermediate insulating-sleeves constitute together a hub which supports and carries the two separated and insulated arms M and P. This hub rotates freely in the bearing formed by the bar Q, and it encircles the rotary harbor E, being concentric, but wholly out of contact therewith, there being an open space between the hub and arbor. Consequently the hub is free to turn independently of the arbor.

The bar Q is electrically connected with the binding-post y, and hence with the circuit-wire 3, by means of an insulated wire 5, Fig. 4. Thus the radial arm P is in permanent electric connection with circuit-wire 3.

The binding-post z, and hence circuit-wire 4, are connected by an insulated wire 6 with a contact-spring R′, which is supported on a hard-rubber pillar S on the base-plate, Figs. 3 and 4. This contact-spring bears against the circular nut f' on the circular collar L, carrying the radial arm M, so that the arm M is always in permanent electric connection with circuit-wire 4.

The circuit-closing wheel G carries a projecting contact-pin T, Figs. 6 and 7, projecting at right angles to said wheel and extending between the radial arms M P. The radial arm M carries a contact-spring h', and the radial arm P carries a contact-spring i'. These springs are separate from each other by a space greater than the diameter of the pin T, which is located between them. The angular distance between arms M and P is less than that between two adjoining projections h h on the periphery of the wheel G. When, therefore, the wheel G moves in one direction a space great enough to bring one of its projections h into co-operative relation with the bowl l on the lever H, the pin T will come in contact with either the spring h' or i', (depending upon the direction,) and will remain in contact with it until the wind shifts, so as to move wheel G in the opposite direction. When the wind so shifts, before a projection h on the wheel G can come in contact with the bowl l on the reverse movement, the pin T will have come in contact with the other contact i' or h'. Hence in whichever way the wheel moves it always is in electric connection with either the circuit-wire 3 or 4,

and the complete circuit is made or broken by the projections *h h;* hence an electric impulse will be conveyed whenever the wind shifts one point of the compass.

In connection with this transmitter there is employed at each distant station a receiving-indicator U, such as is indicated in Fig. 1. This receiving-indicator is provided with a dial *j'*, on which are marked the points of the compass, corresponding with the markings on the transmitter. Operating in connection with this dial is an index *k'*, which moves forward or back, as the case may be, in unison with the index of the transmitter. This index *k'* is moved in opposite directions by the excitation of two electro-magnets *l' m'*. The mechanism intermediate between the magnets and the index is old and well known, and constitutes no part of the present invention. The intermediate mechanism, as is well known, moves the index one step in one direction when the magnet *l'* is excited, and moves the index one step in the opposite direction when the magnet *m'* is excited. Hence it will be evident that by putting the magnets *l' m'* in the same circuits as the wires 3 and 4, leading from the transmitter, the receiving-magnets will be excited by the action of the transmitter, and hence the index of the receiving-indicator will move in unison with that of the transmitter. Both magnets *l' m'* of the receiving-indicator are connected by wires 7 with one pole of a local battery V. From the opposite pole of the local battery a wire 8 leads to a wire 9, the opposite ends of which are connected to two fixed contacts *n' o'*.

W and X are two relay-magnets having respectively pivoted armatures V' Z'. Each armature has its swinging end *p'* composed of hard rubber or other insulating material. In its insulated end the armature V' carries a contact-pin *q'*, which co-operates with the fixed contact *n'*, and in its insulated end the armature Z' carries a contact-pin *r'*, which co-operates with the fixed contact *o'*. The armatures V' Z' are normally held out of contact with their respective magnets by springs *s'*, so that normally the pins *q' r'* are separated from their respective fixed contacts *n' o'*. When the armatures are drawn toward their respective magnets by the excitation of the same, the pins *q' r'* touch their respective contacts *n' o'*.

The receiver-magnet *l'* is connected with the pin *q'* by a wire 10, and the magnet *m'* is connected with the pin *r'* by a wire 11. When, then, the pin *q'* is brought into contact with fixed contact *n'* by the movement of the armature V', a local circuit will be closed through the battery V, wires 7, 8, 9, and 10, and the magnet *l'*, thus exciting the magnet and moving index *k'* one step in one direction; and when the pin *r'* is brought in contact with fixed contact *o'* by the movement of armature Z', then the local circuit will be closed through the battery V, wires 7, 8, 9, and 11, and magnet *m'*, thus moving the index *k'* one step in the other direction. To have these movements of the index of the receiving-indicator controlled by the transmitter it is only necessary to connect the relay-magnet W with circuit-wire 3, and relay-magnet X with circuit-wire 4. Both relays W and X are connected by wire 12 with the main battery K.

The object of making the ends of the armatures V' Z' of insulating material is to protect the receiving-indicator from lightning.

To protect the relay-magnets and transmitter from lightning, a lightning-arrester *t'*, of any well-known construction, is connected with the line-wires 3 and 4 and to earth by a wire 13.

Any number of receiving-stations can be connected with the transmitter by having relay-magnets W X, a receiving-indicator, and a local circuit at each station, and connecting the relay-magnets at the several stations in series by the wires 3 and 4.

I claim as my invention—

1. A rotary arbor, a circuit making and breaking wheel rotated thereby, an electric circuit which is opened and closed by the action of said wheel, an electric generator in said electric circuit, and a contact-pin rotating with said wheel, which is in electric communication with one pole of said electric generator, the electric circuit being opened and closed by the action of said wheel between said generator and said contact-pin, in combination with two separated and insulated contacts, between which said contact-pin is located, said insulated contacts being capable of being freely turned in either direction in arcs concentric with said arbor by the movement of said pin when it comes in contact with said contacts, respectively, and independent circuit-wires in electric connection, respectively, with said insulated contacts and with the opposite pole of said electric generator, substantially as set forth.

2. A wind-vane, a rotary arbor rotated by connection with said wind-vane, a circuit making and breaking wheel rotated by said arbor, an electric circuit which is opened and closed by the action of said wheel, an electric generator in said electric circuit, and a contact-pin rotating with said wheel, which is in electric communication with one pole of said electric generator, the electric circuit being opened and closed by the action of said wheel between said generator and said contact-pin, in combination with two separated and insulated contacts, between which said contact-pin is located, said insulated contacts being capable of being freely turned in either direction in arcs concentric with said arbor by the movement of said pin when it comes in contact with said contacts, respectively, and independent circuit-wires in electric connection, respectively, with said insulated contacts and with the opposite pole of said electric generator, substantially as set forth.

3. A rotary arbor, a circuit making and breaking wheel rotated thereby, an electric circuit which is opened and closed by the action of said wheel, an electric generator in said electric circuit, a contact-pin rotating with said wheel, which is in electric communication with one pole of said electric generator, the electric circuit being opened and closed by the action of said wheel between said generator and said contact-pin, two separated and insulated contacts between which said contact-pin is located, said insulated contacts being capable of being freely turned in either direction in arcs concentric with said arbor by the movement of said pin when it comes in contact with said contacts, respectively, and independent circuit-wires in electric connection, respectively, with said insulated contacts, and with the opposite pole of said electric generator, in combination with an electric indicating-instrument having an index, two magnets which are adapted to move said index in opposite directions, two local electric circuits, each including one of said magnets, and two relay-magnets controlling said local circuits, respectively, each of said relay-magnets being controlled by one of said independent circuit-wires, substantially as set forth.

4. A rotary arbor, a circuit making and breaking wheel rotated thereby, an electric circuit which is opened and closed by the action of said wheel, an electric generator in said electric circuit, a contact-pin rotating with said wheel, which is in electric communication with one pole of said electric generator, the electric circuit being opened and closed by the action of said wheel between said generator and said contact-pin, two separated and insulated contacts between which said contact-pin is located, said insulated contacts being capable of being freely turned in either direction in arcs concentric with said arbor by the movement of said pin when it comes in contact with said contacts, respectively, and independent circuit-wires in electric connection, respectively, with said insulated contacts and with the opposite pole of said electric generator, in combination with an electric indicating-instrument having an index and two magnets which are adapted to move said index in opposite directions, said magnets being controlled, respectively, by said independent circuit-wires, respectively, substantially as set forth.

5. A wind-vane, a rotary arbor rotated by connection with said wind-vane, a circuit making and breaking wheel rotated by said arbor, an electric circuit which is opened and closed by the action of said wheel, an electric generator in said electric circuit, a contact-pin rotated with said wheel, which is in electric communication with one pole of said electric generator, the electric circuit being opened and closed by the action of said wheel between said generator and said contact-pin, and two separated and insulated contacts between which said contact-pin is located, said insulated contacts being capable of being freely turned in either direction in arcs concentric with said arbor by the movement of said pin when it comes in contact with said contacts, respectively, in combination with two relay-magnets, each having an armature which has an insulated portion and a metal contact-pin carried by said insulated portion, a fixed contact, with which said contact-pin is brought into electric connection on the attraction of said armature, a local electric circuit terminating at opposite ends in said contact-pin and said fixed contact, an electric indicating-instrument having two actuating-magnets, which are in the local circuits controlled, respectively, by said two relay-magnets, and two main independent circuit-wires extending from said separated and insulated contacts, respectively, through said relay-magnets, respectively, and to the opposite pole of said electric generator, substantially as set forth.

6. A rotary arbor, a circuit making and breaking wheel having a series of projections on its periphery, a contact-pin on said circuit-breaking wheel, an electric generator, circuit-connections between one pole of said generator and said contact-pin, and a circuit making and breaking lever which opens and closes the circuit, said lever being oscillated by said projections, in combination with two insulated contacts, between which said contact-pin is located, said insulated contacts being capable of being freely turned in either direction in arcs concentric with said arbor by the movement of said pin when it comes in contact with said contacts, respectively, and independent circuit-wires in electric connection, respectively, with said insulated contacts and with the opposite pole of said electric generator, substantially as set forth.

7. The rotary arbor E and the contact-pin rotating therewith, in combination with a hub rotatably mounted in suitable bearings, said hub encircling said arbor, but wholly separated and disconnected therefrom, so that said hub can turn independently of said arbor, and two separated and insulated contacts carried by said hub and located on opposite sides of said contact-pin, substantially as set forth.

8. The rotary arbor E and the contact-pin T, connected to said arbor so as to rotate therewith, in combination with metallic collar L′, encircling said arbor, but insulated therefrom, metallic collar O, encircling said collar L′, but insulated therefrom, arms M and P, carried by said collars L′ and O, respectively, and spring-contacts *h′ i′* on said arms M and P, respectively, said contact-pin being located between said spring-contacts, substantially as set forth.

9. The rotary arbor E, in combination with the cross-bar Q, having a central aperture encircling said arbor, two metallic collars L′ and O, insulated from each other and jour-

naled in the aperture in said bar Q, the inner of said collars encircling but out of contact with said arbor, and the outer of said collars being in contact with said bar Q, substantially as set forth.

10. The rotary arbor E and the cross-bar Q, having a central aperture encircling said arbor, in combination with two metallic collars L′ and O, insulated from each other and journaled in said bar Q, the inner of said collars encircling but out of contact with said arbor, and the outer of said collars being in contact with said bar Q, an electric generator, two circuit-wires connected with one pole of said generator, one of said wires being in electric connection with said bar Q and the other being in electric connection with said inner collar L′, and a third circuit-wire connected with the other pole of said electric generator and being in electric connection with said arbor E, substantially as set forth.

11. The bar Q, the spring R, and two electric circuit-wires connected therewith, in combination with collar L′, having nut *f*′, against which spring R bears, collar O, encircling said collar L′, said collar O being in contact with said bar Q, and an insulating-sleeve N between said collars L′ and O, substantially as set forth.

12. The bar Q, having a central aperture, in combination with collar L′, having nut *f*′, collar O, encircling said collar L′ and turning in the central aperture of said bar Q, said collar having a flange *e*′, resting on said bar Q, an insulating-sleeve N between said collars L′ and O, an insulating-washer *a*′ upon said nut *f*′, and a spring *g*′, bearing against said bar Q and said washer *f*′, substantially as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

HENRY JANSEN HAIGHT.

Witnesses:
W. J. NELSON,
C. S. NEWELL.