No. 620,327. Patented Feb. 28, 1899.

C. L. JAEGER.

ELECTRIC RECORDING SYSTEM.

(Application filed Aug. 11, 1898.)

(No Model.)

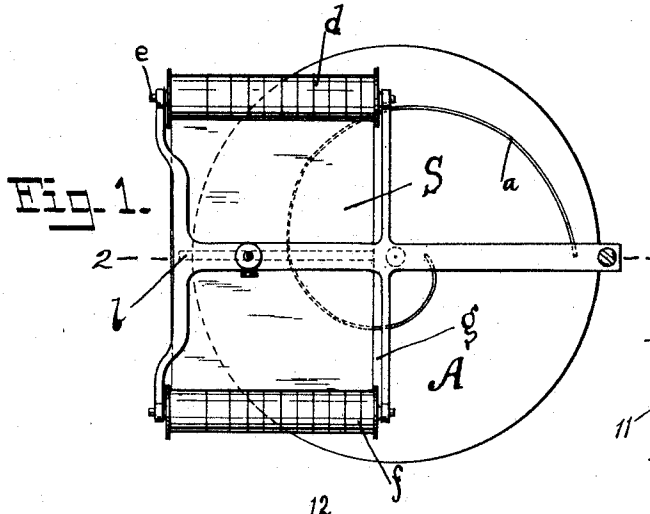


Fig. 1.

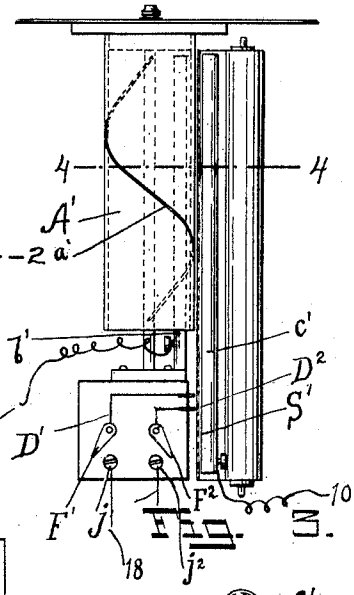


Fig. 3.

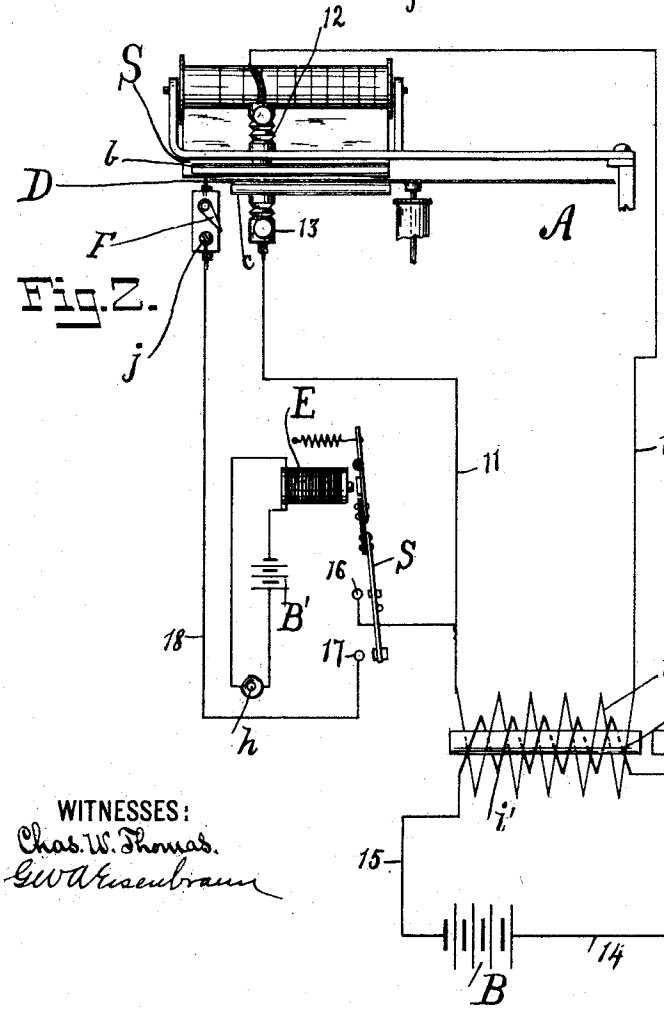


Fig. 2.

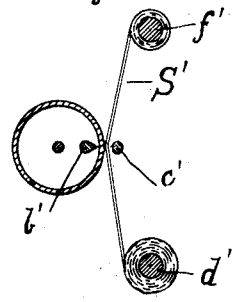


Fig. 4.

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CHARLES L. JAEGER, OF MAYWOOD, NEW JERSEY.

ELECTRIC RECORDING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 620,327, dated February 28, 1899.

Application filed August 11, 1898. Serial No. 688,343. (No model.)

To all whom it may concern:

Be it known that I, CHARLES L. JAEGER, a citizen of the United States of America, residing at Maywood, in the county of Bergen and State of New Jersey, have invented certain new and useful Improvements in Electric Recording Systems, of which the following is a specification.

My invention has reference to improvements in electric apparatus for automatically recording on a piece or strip of paper the direction, distance, speed, time, variations of, and signals used during a vessel's movements—in other words, for recording the distance sailed, the direction sailed, the variation and deviation of the compass, the speed and the variation of the speed, the signals given, and the time of the several records.

My invention has particular reference to the apparatus described in my prior patents, No. 472,124, dated April 5, 1892, and No. 533,902, dated February 12, 1895, and in my prior application, Serial No. 669,546, filed February 8, 1898, it having for its objects, first, to dispense with the metallic curved conductor described in connection with said patents and application, and, secondly, to prevent a secondary faint or false record being formed at the contacts adapted to produce perforations for forming speed, signal, or other auxiliary records.

To this end my invention consists, essentially, in providing a disk made of non-conducting material—such as mica, glass, or rubber—which is provided with a spiral opening or slot conforming in general to the curvatures described in my prior patent, No. 472,124, adjacent to which disk and on opposite sides of the same are placed conductors arranged for the passage of sparks through an interposed strip or chart at the points opposite to the opening or slot in the disk. The conductors are placed in electrical connection with a usual spark-producing device. The disk similarly to the curved recording-arm described in my prior patent, No. 472,124, is arranged to participate in the movements of the compass needle or needles—that is to say, there is a relative motion between said disk and the two conductors caused by changes in the movement or direction of sailing of the vessel or the deviation or variation of the magnetic needle. In like manner I provide in place of the disk adapted for use in the apparatus shown in my Patent No. 472,124 a body made of non-conducting material in the form of a hollow cylinder and provided with a helical opening or slot for the apparatus described in my prior patent, No. 533,902.

My invention, as stated, also consists in means for preventing faint or false sparking between the contact-points of the several auxiliary devices for producing records of the speed of the vessel, signals, &c., which devices consist in means for producing a break in the several circuits connecting with the contacts of the auxiliary records, which break is made adjustable for the purpose of enabling it to be set at a proper point to produce the desired result—that is, the adjustment is effected according to the amount of metal in the respective auxiliary circuit and voltage of the spark-producing device.

The nature of my invention will best be understood when described in connection with the accompanying drawings, in which—

Figure 1 represents a plan or top view of an apparatus constructed according to my invention. Fig. 2 is a section on the line 2 2, Fig. 1. Fig. 3 is a sectional elevation illustrating a modified form. Fig. 4 is a horizontal section on the line 4 4, Fig. 3.

Similar letters and numerals of reference designate corresponding parts throughout the several views of the drawings.

Referring at present to Figs. 1 and 2 of the drawings, the letter A designates a body made in discular form and of a suitable non-conducting material—such as mica, glass, or rubber—and having formed therein an opening or slot *a*, made substantially spiral in form, so as to present continuously-changing points during the rotation or oscillation of such body. The form of this opening or slot corresponds substantially to the metallic spiral previously described in connection with my prior patent, No. 472,124, dated April 5, 1892, and need not be more fully described here. The disk may be caused to revolve or oscillate by suspension on the compass-cap or on the cap of a galvanometer or any other measuring or recording device, or it may be mounted in any other suitable manner to participate in the

movements of a body of which the movements are to be measured. The said body A is mounted between two conductors *b* and *c*, arranged radially on opposite sides of said body A and placed in communication with the secondary coil *i* of an induction-coil I by means of wires 10 and 11, attached to suitable binding-posts 12 and 13, secured to said conductors *b* and *c*. The primary coil *i'* of the induction-coil is connected with a battery B by wires 14 and 15 with the interpolation in a usual manner of a vibrator or contact-breaker C. Of course it is to be understood that any other usual spark-producing device may be substituted for the induction-coil—such, for instance, as the static machine. It is evident that as the body A moves—as, for instance, in a galvanometer—or when there is a relative movement between the said body and the radial conductors caused by the variations of a ship's course, as when embodied in a compass, a record is produced by the perforations in the chart or strip S, interposed between the two radial conductors *b* and *c*. The strip here shown is continuously fed by a roll *d*, having its shaft *e* connected with a clock-movement or other actuating device, said strip being fed from a second roll *f*. Said rolls are mounted in a suitable frame *g* in a usual manner. The record referred to, it is of course to be understood, is produced by the passage of sparks between the radial conductors *b c* at the point of intersection of the opening or slot *a* with said conductors in a similar manner as the sparks are produced in my prior patents by the passage between the metallic curved conductor and the radial conductor.

The second part of my invention consists in means for preventing the formation of faint or false secondary perforations at the auxiliary recording-conductors—for instance, those adapted to record speed, signals, revolutions, &c. Referring to Fig. 2 of the drawings, the letter D designates one of these conductors, which is arranged beyond the periphery of the body A and opposite to one of the conductors *b*, so that sparks passing from said conductor to the radial conductor *b* will perforate the strip or chart and form a record preferably external or beyond that produced by the passage of sparks through the opening or slot *a* in the body A. The circuit is closed through said conductor and the secondary coil *i* of the induction-coil or other spark-producing device I by a suitable circuit-closer or push-button *h*, placed in the circuit of a battery B', including an electromagnet E, adapted to operate a switch S, adapted to close the circuit at the points 16 and 17 through the wire 18 and wire 10 of the induction-coil, thus causing the passage of sparks from the conductor D to the radial conductor *b*. To prevent the discharge of sparks through the radial conductor *b* to the conductor D during the time that the switch S is not in contact with the points 16 and 17—that is to say, during the time that the push-button *h* is not depressed—I provide means for forming a break in said circuit, which is adjustable according to the voltage of the secondary coil *i* of the induction-coil I and the amount of metal in the wire 18 of the conductor D. In the present instance I have shown the means for forming this break to be constituted of an arm F, which is movable preferably by hinging the same with reference to a contact-post *j*, to which the end of the wire 18 is connected. The conductor D is in electrical connection with the pivot or hinge of said arm F, so that by changing the distance between the end of the arm F and the post *j* dissipated sparking may be prevented between said arm and said post, and consequently between the conductor D and the conductor *b*, so long as the switch S is not thrown in a position to close the auxiliary circuit connected with the conductor D.

It is of course to be understood that a separate adjustable device is provided for each conductor D of the several special signals which may be used, although I have shown but one such special signal device in Figs. 1 and 2. For the compass-record, which is a continuous record—that is to say, the passage of sparks is substantially continuous—no such provision need be made.

In Figs. 3 and 4 I have shown the devices hereinbefore described adapted to the vertical construction illustrated in my prior Letters Patent, No. 533,902, dated February 12, 1895, A' being the body, made of non-conducting material and cylindrical in form instead of discular. The same is arranged to rotate about a vertical axis and is provided with a helical slot *a'*, corresponding to the slot *a* in the discular body A. Adjacent to said cylindrical body A' are arranged two conductors *b'* and *c'*, one of the same being on the interior and the other on the exterior of said cylindrical body, but not in actual contact with the same. The strip S' is conducted between the two conductors *b'* and *c'* and continuously fed by a roll *d'*, having its shaft in connection with a clock-movement or other actuating device, as before described. The strip is fed from a feed-roll *f'*, Fig. 4. The conductors *b'* and *c'* are in connection with wires 10 and 11 of an induction-coil or other spark-producing device, as previously described in connection with Figs. 1 and 2. A conductor D' is arranged adjacent to the strip S' and opposite to the conductor *c'*, which is extended below the conductor *d'*, and an adjustable break F' and *j'*, of the same construction described in connection with Figs. 1 and 2, is made use of. In the present example I have shown a second conductor D^2 and an adjustable break F^2 and j^2 for the purpose of producing a second series of perforations corresponding to another auxiliary signal.

What I claim as new is—

1. In an electric recording apparatus, the combination of a movable body made of non-conducting material and provided with an

opening or slot permitting the passage of sparks, means for moving a strip or chart, means for producing sparks, and electrical connections, substantially as described.

2. In an electric recording apparatus, the combination of a movable body made of non-conducting material and provided with an opening or slot permitting the passage of sparks, two conductors arranged on opposite sides of the movable body, means for moving a strip or chart between said conductors, means for producing sparks between said conductors, and electrical connections, substantially as described.

3. In an electric recording apparatus, the combination of a movable body made of non-conducting material and provided with an opening or slot permitting the passage of sparks, two radial conductors arranged on opposite sides of the movable body, means for moving a strip or chart between said conductors, means for producing sparks between said conductors, and electrical connections, substantially as described.

4. In an electric recording apparatus, the combination of a movable body, made of non-conducting material and provided with a curved opening or slot, two conductors arranged on opposite sides of said movable body; all adapted for the passage of sparks at predetermined points according to the position of the movable body, an auxiliary conductor arranged adjacent to one of the primary conductors, means for forming an adjustable break or resistance in the circuit of said auxiliary conductor, and a spark-producing device including both sets of conductors in its circuit, substantially as described.

5. The combination with an electric recording apparatus having a spark-producing device adapted to perforate a strip or chart for the purpose of producing a record, of an auxiliary record-producing device placed in a circuit of said spark-producing device and provided with means for regulating or adjusting the resistance offered to the passage of sparks, substantially as described.

6. The combination with an electric recording apparatus having a spark-producing device adapted to perforate a strip or chart for forming a record, of an auxiliary record-producing device placed in a circuit of said spark-producing device and provided with means for regulating or adjusting the resistance offered to the passage of sparks, a relay-switch adapted to close the circuit of the spark-producing device through the auxiliary record-producing device, a relay-magnet acting on said switch, a source of electricity, and means for closing the source of electricity through said electromagnet, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

CHARLES L. JAEGER.

Witnesses:
EUGENIE P. HENDRICKSON,
EMMA PERSIDES.