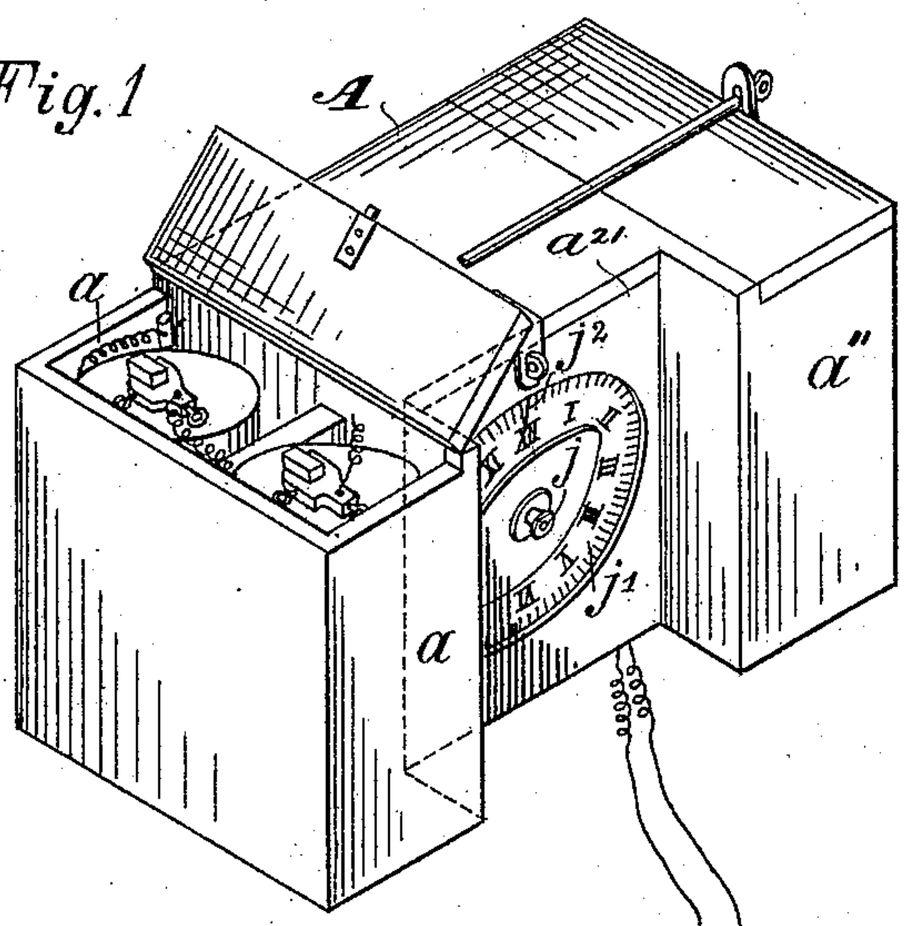
(No Model.) 4 Sheets—Sheet 1.

J. BELLUSSICH.

AUTOMATIC RECORDING APPARATUS FOR VEHICLES.

No. 442,849. Patented Dec. 16, 1890.

Fig. 1



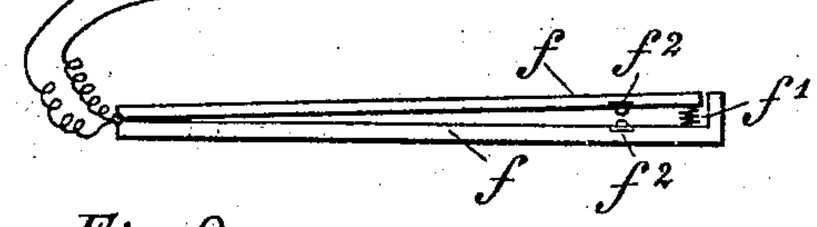
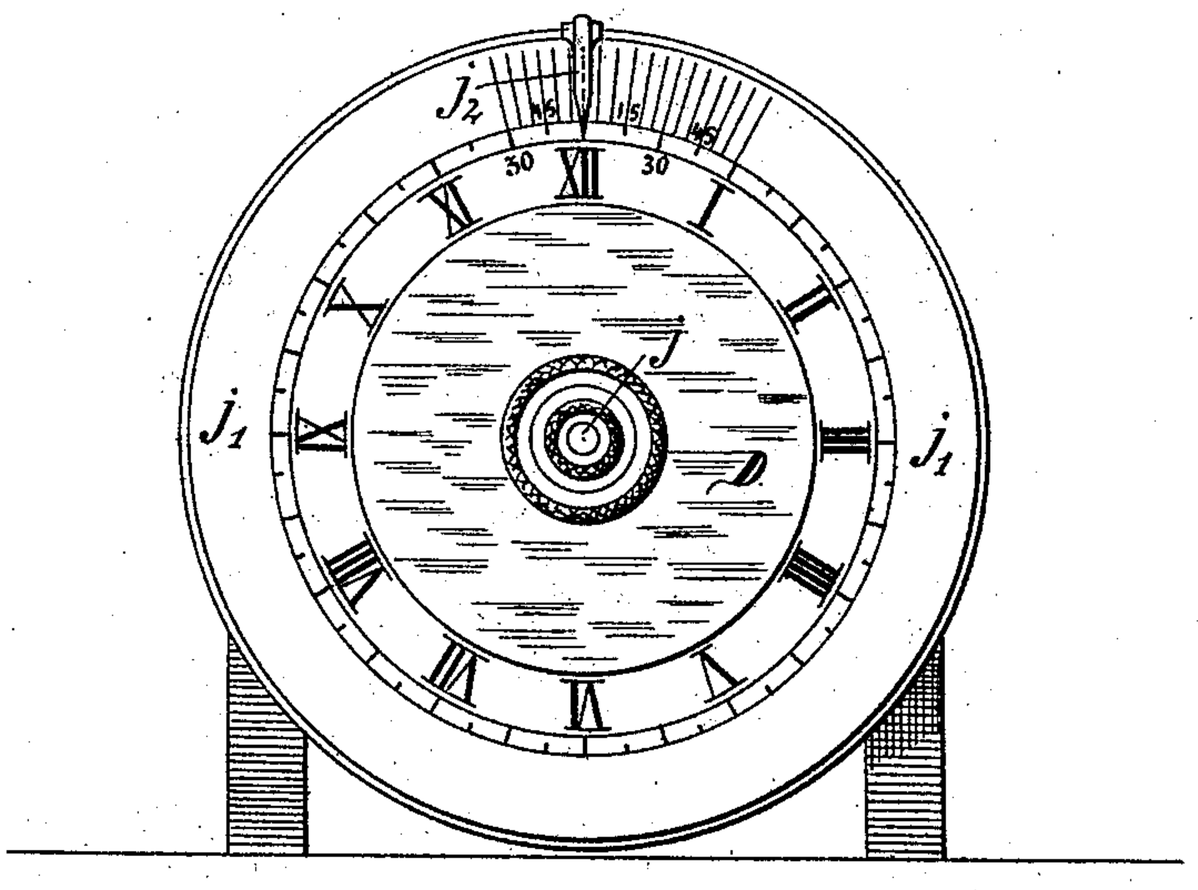


Fig. 2



Witnesses.
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Inventor:
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Attorney.

(No Model.) 4 Sheets—Sheet 2.

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AUTOMATIC RECORDING APPARATUS FOR VEHICLES.

No. 442,849. Patented Dec. 16, 1890.

Fig. 4.

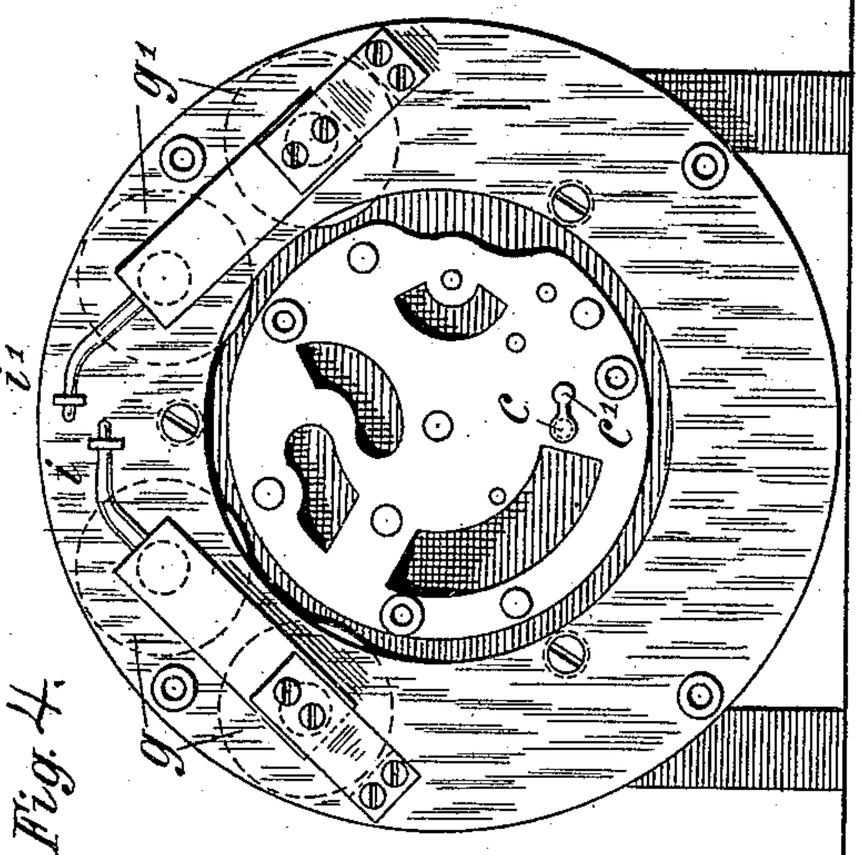


Fig. 10.

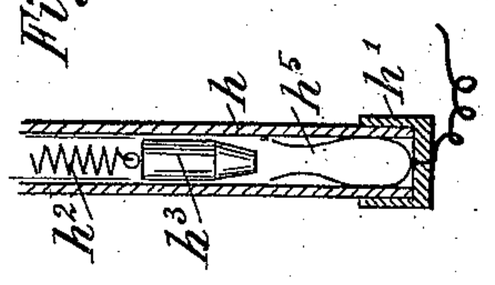


Fig. 9.

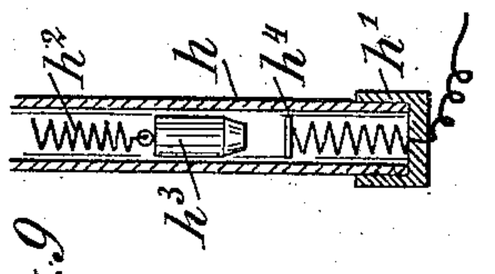


Fig. 3.

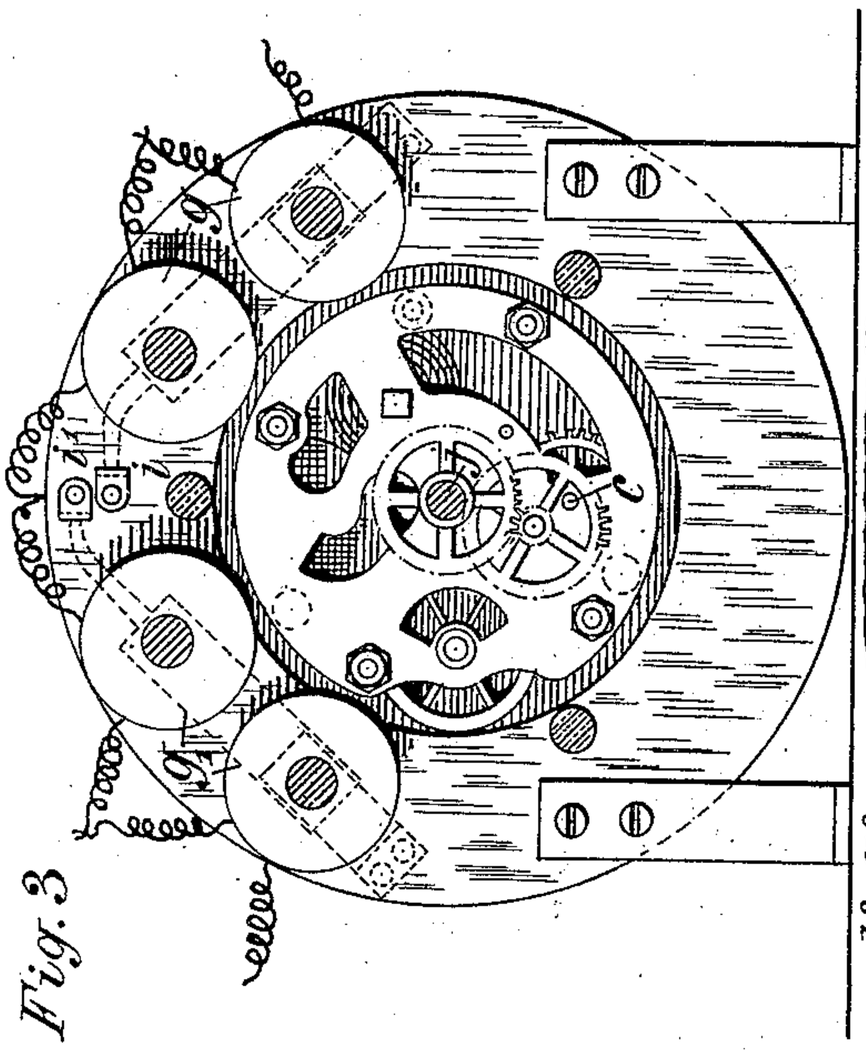
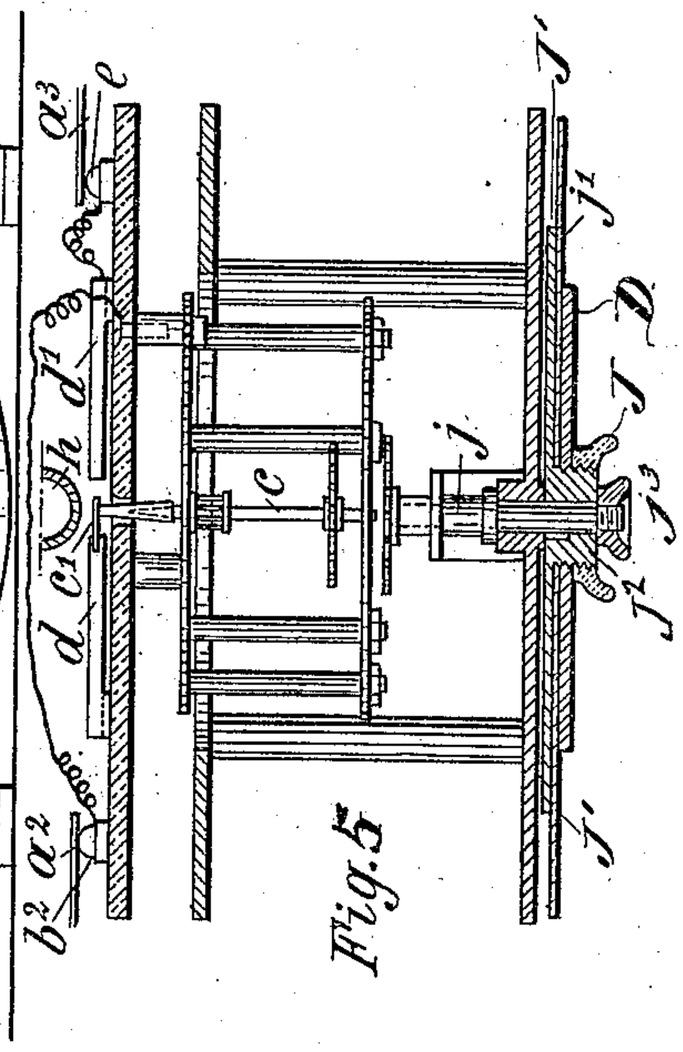


Fig. 5.



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AUTOMATIC RECORDING APPARATUS FOR VEHICLES.

No. 442,849. Patented Dec. 16, 1890.

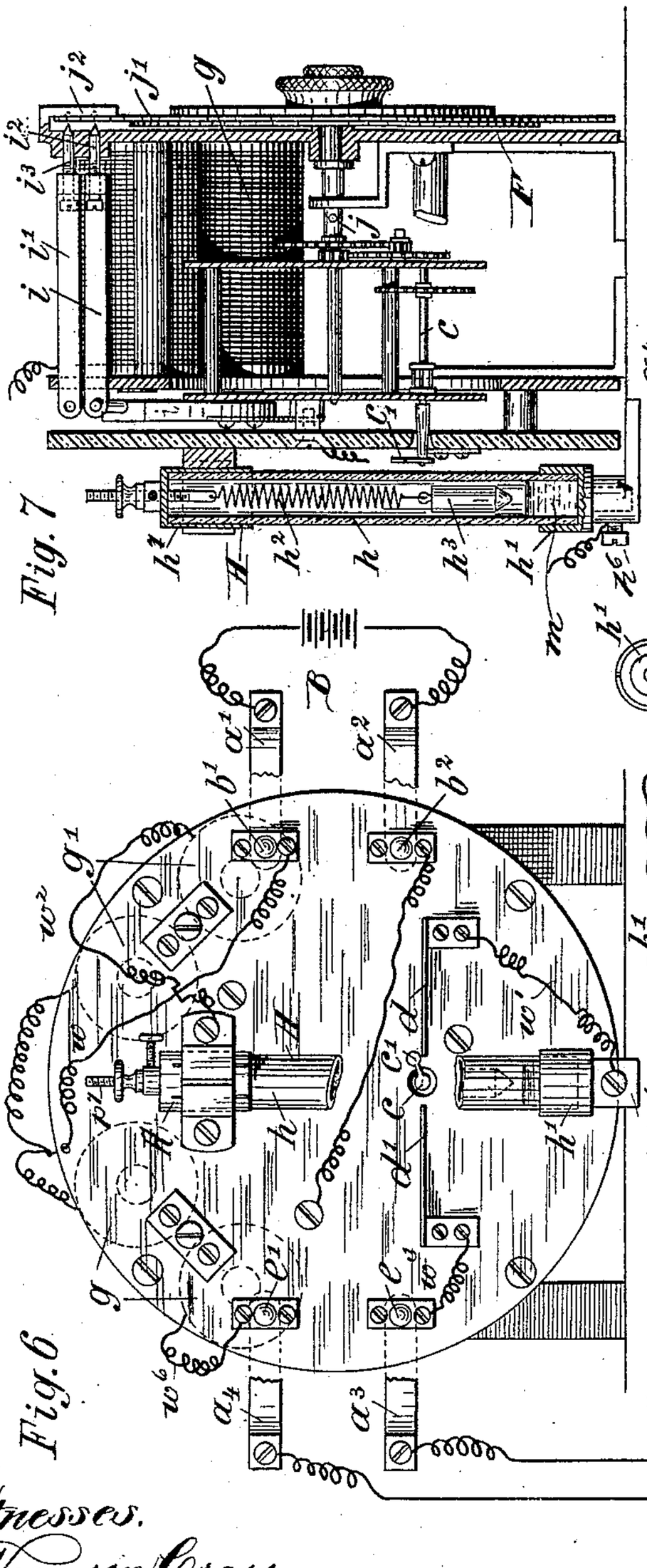

Fig. 7

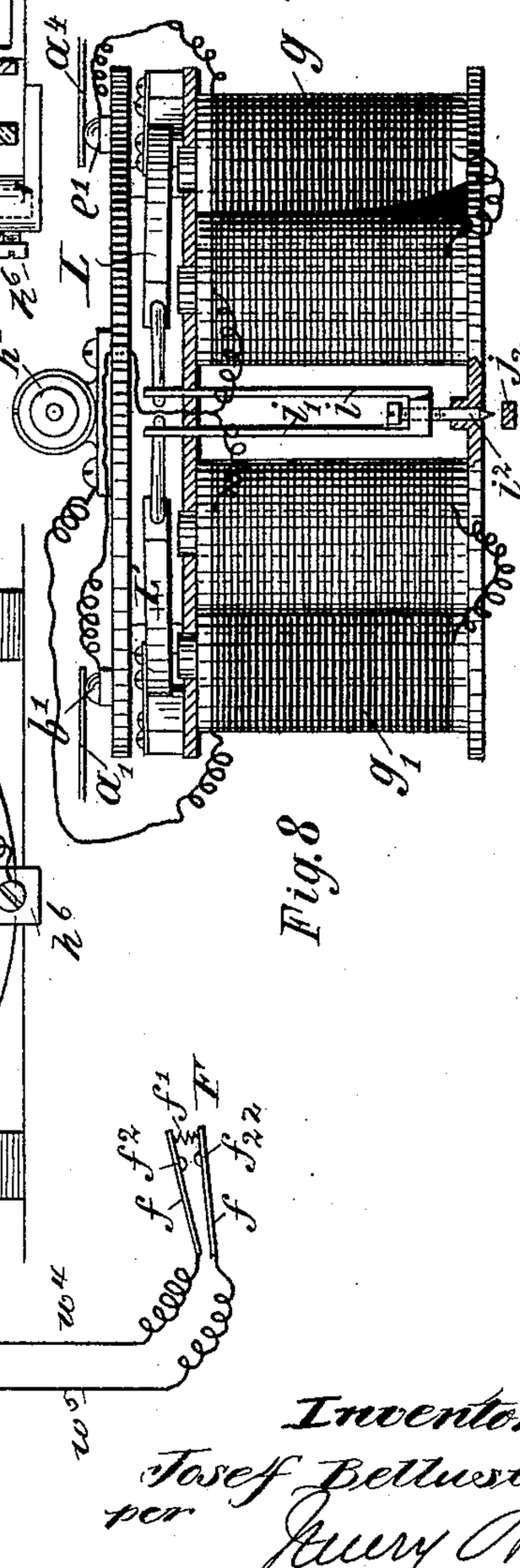

Fig. 8

Fig. 6

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(No Model.) 4 Sheets—Sheet 4.

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AUTOMATIC RECORDING APPARATUS FOR VEHICLES.

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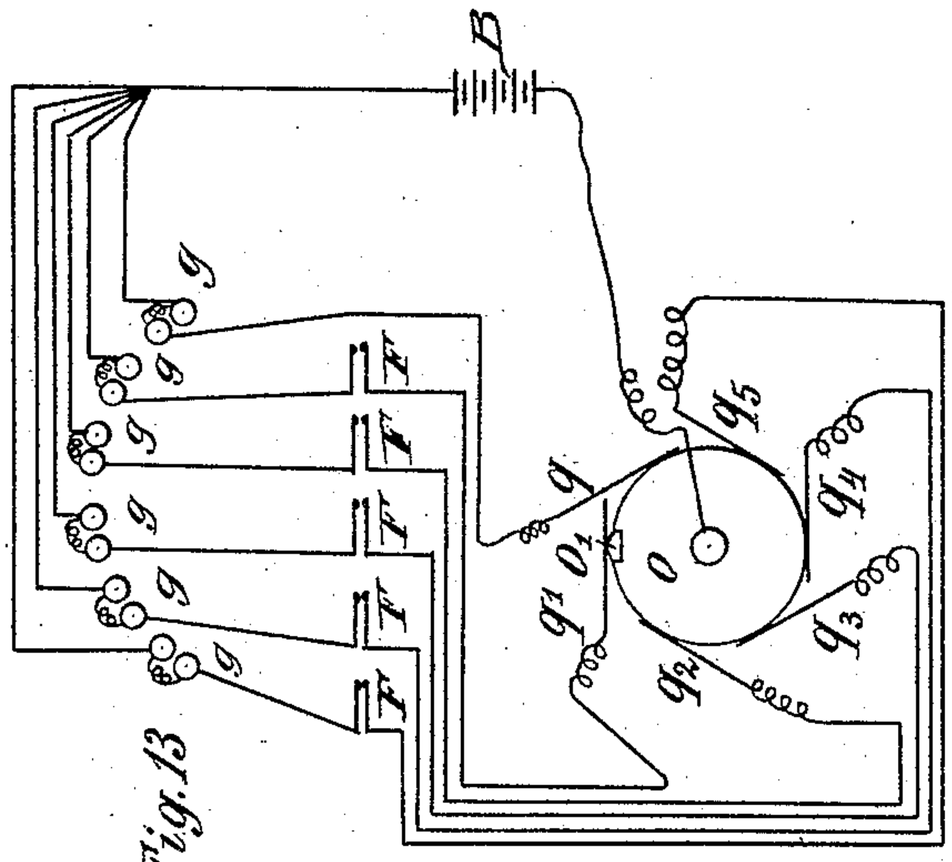

Fig. 13

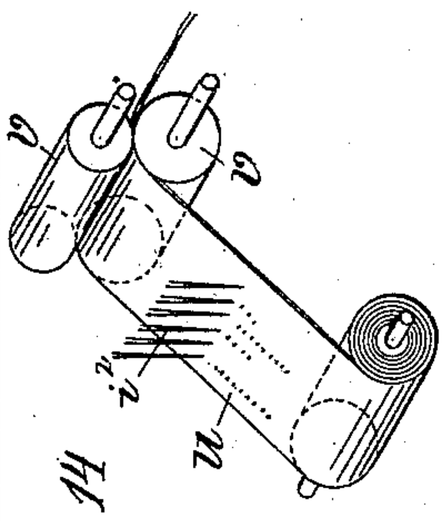

Fig. 14

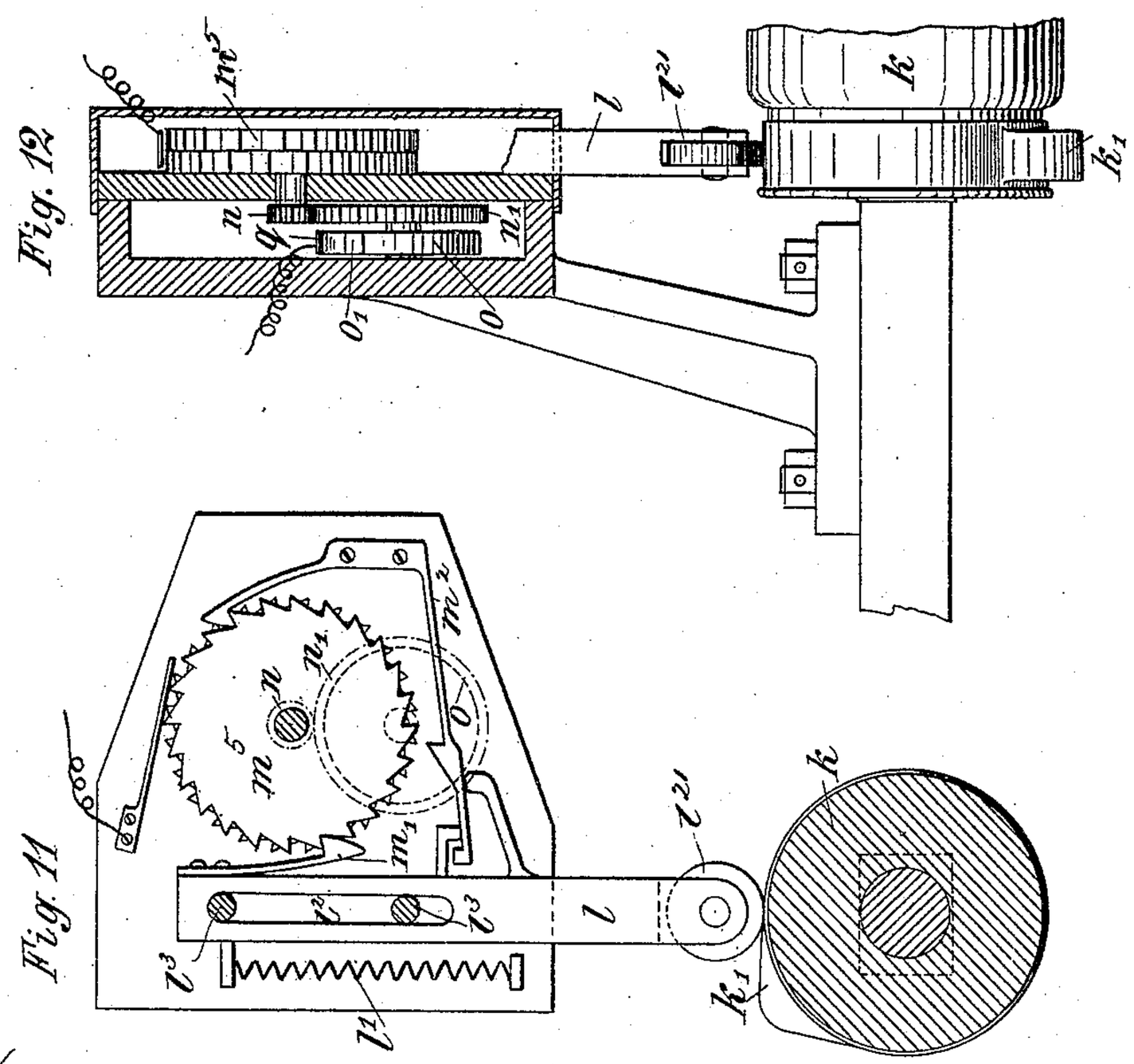

Fig. 12

Fig. 11

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UNITED STATES PATENT OFFICE.

JOSEF BELLUSSICH, OF CAPO D'ISTRIA, AUSTRIA-HUNGARY.

AUTOMATIC RECORDING APPARATUS FOR VEHICLES.

SPECIFICATION forming part of Letters Patent No. 442,849, dated December 16, 1890.

Application filed July 11, 1889. Serial No. 317,174. (No model.)

To all whom it may concern:

Be it known that I, JOSEF BELLUSSICH, professor, subject of the Emperor of Austria-Hungary, residing at Capo d'Istria, in the Province of Istria, in the Empire of Austria-Hungary, have invented certain new and useful Improvements in Automatic Recording Apparatus for Vehicles; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

Referring to the drawings, Figure 1 is an isometric view of my recording apparatus, one of the compartments containing an electric couple being shown open. Fig. 2 is a rear elevation of the clock mechanism thereof, showing the record-disk, clock-dial, and hand. Figs. 3 and 4 are front and rear elevations, respectively, of the clock mechanism and other parts combined therewith. Fig. 5 is an irregular transverse section of the clock mechanism, taken on the lines of the hour and minute wheels, respectively. Fig. 6 is a rear elevation of the clock mechanism and other parts combined therewith, a portion of the seismoscopic circuit-closer being broken away and showing the electrical connections. Fig. 7 is a vertical transverse section thereof, taken on the line of the hour-wheel shaft. Fig. 8 is a top plan view of Fig. 7. Figs. 9 and 10 are detail sections of the lower portions of the seismoscopic circuit-closer, showing modified contacts. Figs. 11 and 12 are detail sectional side and end elevations, respectively, of means for controlling the operation of the devices for recording the movements of a vehicle from one of the wheels thereof. Fig. 13 is a diagram illustrating the electrical connections between the recording devices of the seats of a vehicle and Fig. 14 is an isometric detail view of record-styles operating in conjunction with a strip of paper.

The invention relates to apparatus for recording the running-time of a vehicle, and also the time of occupancy of such vehicle by one or more passengers, and has for its object to provide a simple and convenient mechanism whereby these results are obtained automatically.

The invention consists in recording devices controlled by a passenger on taking his seat, and in recording devices controlled by the movements of the vehicle, in combination with a time mechanism, electric circuits, circuit-closers, and suitable electric connections; in structural features, and in combination and co-operation of parts, substantially as hereinafter more fully described, and as set forth in the claims.

Referring to Fig. 1, A indicates the inclosing-casing divided into three compartments a, a^{11}, and a^{21}. The outer compartments a and a^{11} contain each an electric couple, while the central compartment contains the clock mechanism, electrical contacts, recording mechanism, and electro-magnets, any suitable means being provided to lock each of said compartments to prevent unauthorized tampering with the operative mechanisms.

The apparatus comprises a plurality of electric circuits, each including an electro-magnet, a style operated thereby, and a circuit-closer. The circuit-closer for the electro-magnet that operates the style which records the running-time of the vehicle is controlled by the motion thereof, while the circuit-closers for the electro-magnet that operates the styles which record the time of occupancy of the vehicle are controlled by the passenger on taking his seat; also, in combination with these devices, of automatically-operated means that alternately and periodically cut out and restore the electro-magnets; also, a record-card in reach of the styles, and a mechanism for imparting a uniform motion to the card. The said means may be operated either by a time mechanism or by a mechanism timed by the speed of the vehicle, while the record device for recording the running-time of the vehicle may be controlled by the vibrations or oscillations of the vehicle or by the motion of one of its wheels.

I will first describe the arrangement of devices controlled by the vibrations or oscillations of the vehicle and by a time mechanism.

Referring to Figs. 2, 4, and 5, j is the hour-wheel shaft, on the outer end on which is mounted a disk J′, that has a central exteriorly-threaded hub or sleeve J^2, between which disk J′ and the nut J are clamped a disk D and a paper disk or record-card j', (see Fig. 5,) said parts being held in position

by a nut j^3; and j^2 is a stationary hand or index. The paper disk j' has the hours and fractions marked thereon, and said hours and fractions are indicated by lines drawn to the periphery of the disks, as shown in Fig. 2. As the hand j^2 is stationary, the disk will necessarily have a motion in a direction the reverse of that of the ordinary hands of a clock to properly indicate time. The poles of the two couples or elements contained in the compartments a and a^{11}, and which constitute the battery B, (shown diagrammatically in Fig. 6,) are respectively connected with two contact-springs a' a^2 in the central compartment a^{21} of the inclosing-casing A, the said springs a' a^2 bearing upon contact buttons or screws b' b^2, respectively, secured to the frame-work in which the clock mechanism is mounted, in which frame-work are also secured the electro-magnets g and g'. The electro-magnets g and g' are in electrical connection with the battery and the contact-springs d and d' of a shunt controlled by the minute-wheel arbor of a time mechanism. The contact-spring d is connected with one of the contacts of a seismoscopic circuit-closer H, which, as shown in Figs. 6, 7, and 8, is composed of a glass tube h, closed at top and bottom by means of metallic caps h' h^7, respectively, and contains in its lower part a small portion of mercury m, that is connected with spring d through binding-screw h^6 and wire w'. Within the tube is suspended from a very elastic or resilient spring h^2 a weight h^3, the conical point of which is in close proximity to the surface of the mercury, and said weight is electrically connected through its supporting-spring, the screw h^7, and a wire w^2 with the electro-magnet g', which latter is connected by the insulated wire w with the button or screw b', and through the latter and the spring a' with the battery B. So long as the vehicle is not in motion there will be no contact between the weight h^3 and mercury m; but when the vehicle is moving the vibration or oscillation thereof produces corresponding vibrations or oscillations in the weight, which is caused thereby to alternately move into and out of contact with the mercury, alternately making and breaking the battery-circuit through a^2, b^2, c, c', d, w', h^6, m, h^3, h^2, h^7, w^2, g', b', and a' so long as or whenever c' contacts with spring d, or once every minute, since c' is secured to the arbor c of the minute-wheel of a time mechanism. The rapidity of these contacts between h^3 and m will of course depend upon the rapidity of the vibratory motions or oscillations of the vehicle, and the latter will necessarily depend upon the speed of the vehicle, so that the number of contacts between h^3 and m during the short period of contact between c' and d will produce a corresponding number of vibrations in the armature-lever, and these vibrations may be recorded to indicate the speed of the vehicle, as well as the length of time the vehicle has been in motion, as will be hereinafter explained. Inasmuch as mercury is readily oxidized, a spring-supported contact-disk h^4 or a very resilient forked contact-spring h^5, Figs. 9 and 10, may be used instead.

I will now describe the means for obtaining a record of the time the vehicle is occupied by one or more passengers. The spring d' is also connected with one of the contacts of a circuit-closer F, arranged in the seat of the vehicle and consisting of two plates f f^2, carrying each a contact f^{21} f^{22}, held apart by a spring f', so that a person taking a seat in the vehicle will move the contacts together to close the circuit through electro-magnet g whenever the arm c' on the minute-wheel arbor c comes in contact with spring d'. As shown, said spring d' is connected by wire w^3 with a contact button or screw e, upon which bears a contact-spring a^3, that is connected by wire w^4 with contact f^{21} of the seat circuit-closer. The other contact f^{22} of said circuit-closer is connected by wire w^5 with a contact-spring a^4, that bears upon a contact button or screw e', connected by wire w^6 with the electro-magnet g, and said electro-magnet g is connected with the battery B by the insulated wire w, contact-button b', and spring a'. During the occupancy of a seat in the vehicle the battery-circuit, including the electro-magnet g, will be closed whenever the arm c' on the arbor c of the minute-wheel comes in contact with the spring d', or once at every revolution of said arbor or every minute, thereby attracting the armature-lever, the movement of which may be recorded, as presently described. If the vehicle seats a number of persons, each seat must be provided with a circuit-closer, all of which must be arranged in multiple arc, and if a record is to be kept of the time each seat is occupied their circuit-closers must be included in separate circuits, each including an armature-lever and a style, as will be readily understood.

I will now describe the means for recording the running-time as well as the time of occupancy of the vehicle.

I have hereinbefore stated that the hour-wheel arbor carries a record-card j', having time-indices, and upon which the vibrations of the armature-levers of the electro-magnets g and g' may be recorded; but it is obvious that this is not absolutely necessary, and is given only as an example for recording the said vibrations, as a strip or fillet of paper may be used for recording, as will hereinafter appear. When the record-disk is used, the levers L L' of the armatures g g' are each provided with a style-holder i and i', respectively, in the end of which is screwed a style i^2, thereby permitting the adjustment of it in the holder relatively to the record-card j'. The two styles lie in the plane of one and the same radius of the card, and are guided in openings in the front frame-plate F of the clock-work, to which is secured or on which is formed the overhanging hand j^2, that has two recesses to receive the points of the

styles i^2. As shown in Fig. 7, the record-disk bears against the back of the hand or is made to bear thereon when the styles are thrown forward by the attraction of the armature-levers, so that the hand performs also the functions of a bearing for the paper while it is being perforated. The indices produced by the vibrations of the armature-lever L of the electro-magnet g will indicate the time of occupancy of a seat in the vehicle, while those produced by the vibrations of the armature-lever of the electro-magnet g' will indicate the time during which the vehicle has been in motion. If desired, the indices made by the styles i^2 may be produced in colors by well-known means.

As hereinbefore stated, the recording devices may be controlled by the forward motion of the vehicle—that is to say, by the rotary motion of one of the wheels thereof, as shown in Figs, 11, 12, and 13—in which case the hub k of one of the wheels has a cam projection k', and upon said hub rides a wheel or roller l^{21}, journaled at the lower end of a bar l, that is slotted, as at l^2, and guided in its movements by pins l^3, said bar being held to the hub k by a spring l'. To the upper end of the bar is secured a pawl m' in engagement with the teeth of a ratchet-wheel m^5, whose shaft carries a pinion n in gear with a wheel n'. On the shaft of wheel n' is mounted a contact-disk o, made of a non-conductive material, and has on its periphery a single metallic contact o', which is in electrical connection with one of the poles of the battery B. A two-armed spring-locking or escapement pawl m^2 is so arranged and controlled by the bar l as that when said bar is caused to reciprocate vertically by the alternate action of the cam k' and spring l' the ratchet will be locked against backward rotation, as will be readily understood.

q q' q^2 q^3, &c., are contact-springs whose free ends bear upon the periphery of the contact-disk o, each of which springs is included in an electric circuit, that of spring q comprising the electro-magnet g', whose armature-lever actuates that style which serves to record the time during which the vehicle is in motion, while each of the circuits, including the springs q' q^2, &c., comprises, besides an electro-magnet g, also a seat circuit-closer, F, there being as many circuits B o' q' F g as there are seats in the vehicle. The styles i^2, operated by the armature-levers of the different electro-magnets, may here be arranged so as to perforate a graduated strip of paper, (see Fig. 14,) to which a uniform motion is imparted by the clock-work v v, indicating the driving-rolls operated by such clock-work. At every revolution of the hub k the bar l is thrown upward, thereby imparting a partial rotation to the ratchet-wheel m^5, and through said wheel and the intermediate gearing n n' to the disk o. At every revolution of said disk the circuit including the spring q, as well as the circuit of that or those seats which are occupied by a passenger or passengers, are closed, a record being made by the several styles in the moving strip or fillet of paper, the speed of the vehicle being indicated by the difference between the perforations in the strip u.

I claim—

1. In an automatic recording apparatus for vehicles, the combination, with a time-motor, a contact-arm on a shaft of said motor, and a recording-disk on another shaft of the motor, said disk being provided with time-divisions corresponding with the speed of its supporting-shaft, of an electro-magnet, make-and-break devices included in an electric circuit, said make-and-break devices being arranged in the path of the contact-arm, and a recording-stylus controlled by the electro-magnet and arranged to present its point to the recording-disk, said parts being arranged for operation substantially as and for the purpose set forth.

2. In an automatic recording apparatus for vehicles, the combination, with a time-motor, a contact-arm secured to a shaft of said motor, and a recording-disk on another shaft of the motor, said disk being provided with time-divisions corresponding with the speed of its shaft, of an electro-magnet in rear of the recording-disk and arranged with its poles facing in opposite directions, a style arranged to present its point to said disk, a connecting-rod connecting the style with the armature of the electro-magnet, and make-and-break devices included in an electric circuit including the electro-magnet, said make-and-break devices being arranged in the path of the contact-arm, as and for the purposes set forth.

3. In an automatic recording apparatus for vehicles, the combination, with a time-motor, a contact-arm on a shaft of the motor, a recording-disk on another shaft of said motor, said recording-disk having time-divisions corresponding with the speed of its shaft, an electro-magnet arranged with its poles turned away from the disk, a make-and-break device included in an electric circuit including said electro-magnet, said make-and-break device being arranged in the path of the contact-arm, and a recording-style controlled by the electro-magnet, of a second electro-magnet and recording-style controlled thereby and a make-and-break device in a separate electric circuit, said make-and-break device being controlled, as described, and said recording-styles being arranged in the same radial plane, substantially as and for the purpose set forth.

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

JOSEF BELLUSSICH.

Witnesses:

EDMUND JUSSEN,

OTTO SCHIFFER.