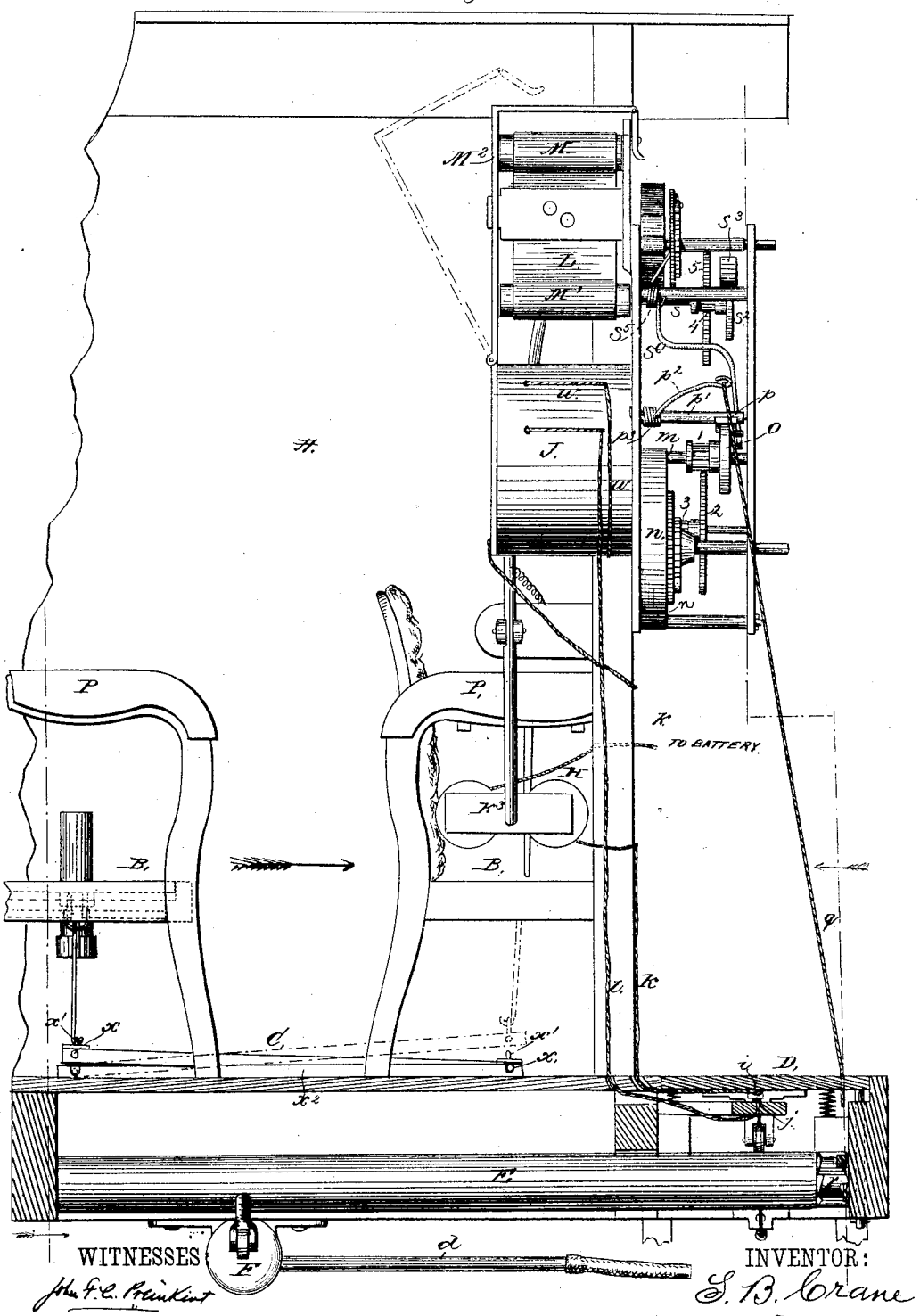
4 Sheets—Sheet 1.

S. B. CRANE.

Electrical Passenger-Recorder.

No. 219,917. Patented Sept. 23, 1879.

Fig. 1.



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4 Sheets—Sheet 2.

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Electrical Passenger-Recorder.

No. 219,917. **Patented Sept. 23, 1879.**

Fig. 2.

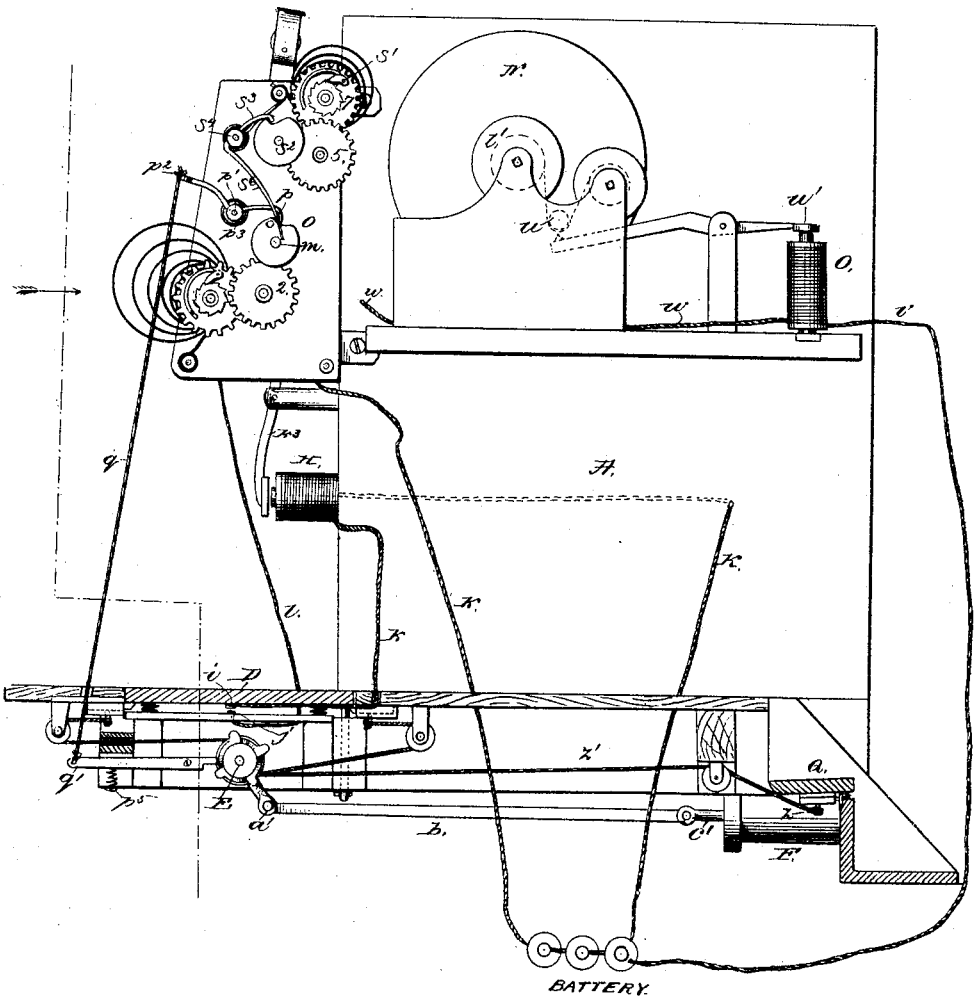

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Fig. 3.

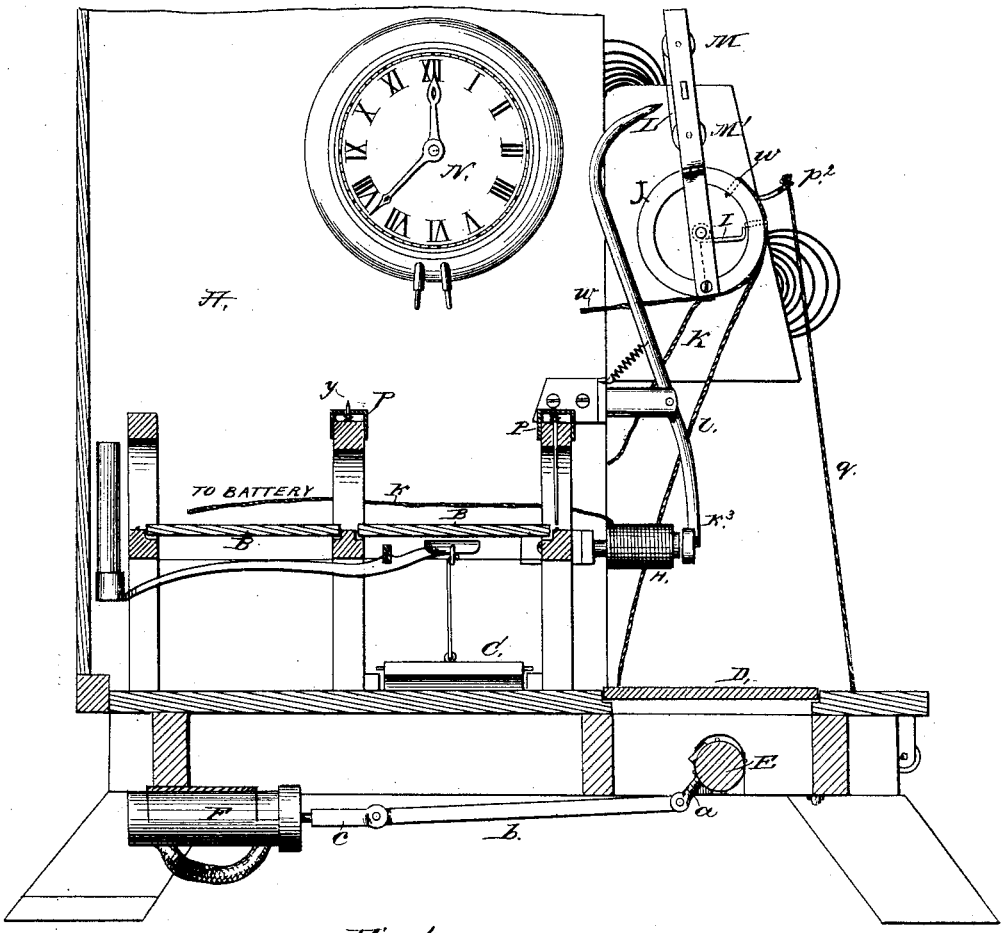
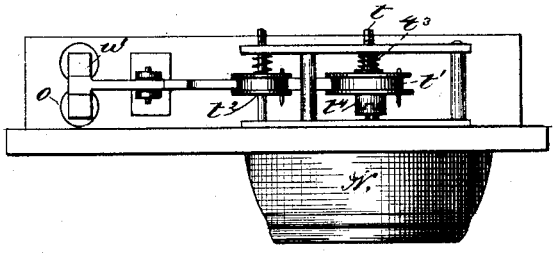


Fig. 4.



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No. 219,917. Patented Sept. 23, 1879.

Fig. 6.

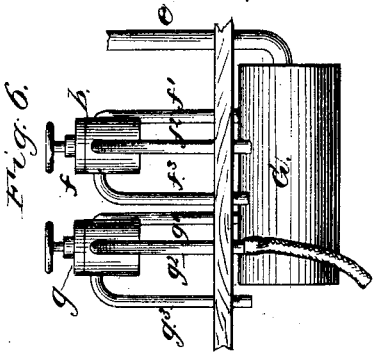
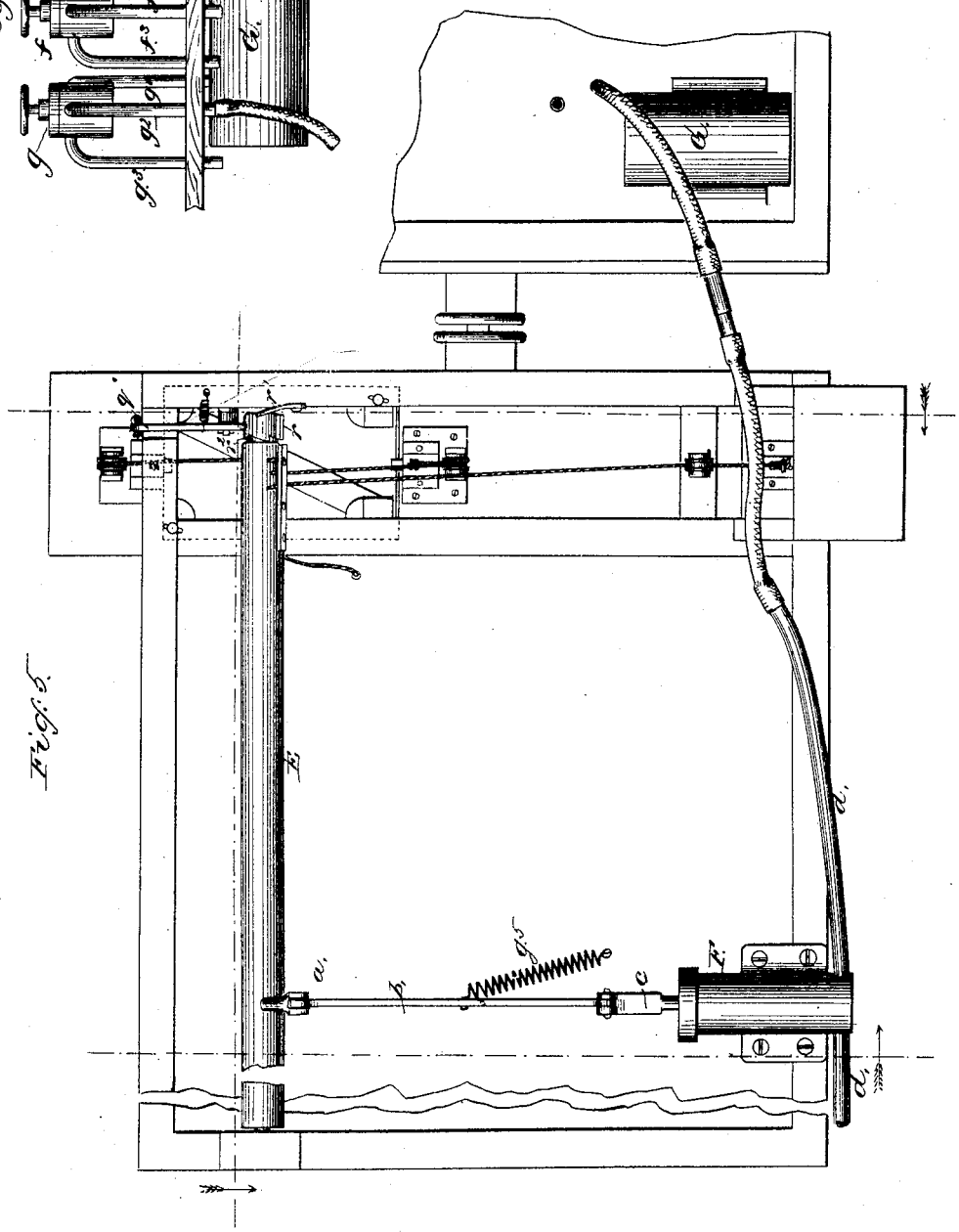


Fig. 4.



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UNITED STATES PATENT OFFICE

SYLVANUS B. CRANE, OF DAVENPORT, IOWA.

IMPROVEMENT IN ELECTRICAL PASSENGER-RECORDERS.

Specification forming part of Letters Patent No. **219,917**, dated September 23, 1879; application filed June 13, 1879.

To all whom it may concern:

Be it known that I, SYLVANUS B. CRANE, of Davenport, in the county of Scott and State of Iowa, have invented a new and Improved Passenger-Register; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a longitudinal sectional view, taken through the aisle of the car. Fig. 2 is an end view with the platform and steps of the car in vertical section. Fig. 3 is a transverse sectional view looking from the inside of the car. Fig. 4 is a plan view of the time-recording mechanism. Fig. 5 is an underneath view. Fig. 6 is a detail view of the three-way cocks for controlling the passage of air from the air-cylinder to the devices operated thereby.

My invention relates to a complete passenger-register designed to register all of the passengers of a railway-car or analogous vehicle, whether sitting upon the seats, standing between seats, sitting on the arm-rests, standing in the aisle, or standing upon the steps outside of the car; and it proceeds upon the general principle of closing an electric circuit by the depression of the support upon which the passenger may be sitting or standing.

In the patent granted me April 22, 1879, I provided for the registration of passengers standing in the aisle by a series of sinking platforms, which were normally held rigid by locking devices, and at a given time were allowed to sink from the weight of the passenger by the withdrawal of the locking device through a continuous rock-shaft. Said patent also described a yielding seat and foot-rest operating to close an electrical circuit upon the same general principle.

My present invention embodies these general features; and consists, first, in the peculiar means for applying power to effect the rocking of said shaft; in the peculiar arrangement of the foot-rest in adapting it to the reversal of the seats; also, in the peculiar construction and arrangement of recording mechanism connected with the rock-shaft for simultaneous operation therewith; and in the construction and arrangement of a time-recording mechanism, adapted to operate in connection with the passenger-register to indicate the time of said registration, and also in a vertically-adjustable arm-rest adapted to register persons sitting thereon, all as hereinafter more fully described.

In the drawings, A represents the framework of a railway-car. B, Figs. 1 and 3, are the yielding seats connected to the foot-rests C, and D are the sinking platforms in the aisle of the car, which are provided with locking-bolts, and which bolts are connected by cords and pulleys to the rock-shaft E, extending the full length of the car, substantially as described in my Letters Patent referred to. In providing means for rocking said shaft to withdraw the locking-bolts and allow the weight of the passenger to close the electrical circuit, I connect to said rock-shaft an arm, *a*, Figs. 2 3 5, which is jointed to a pitman, *b*, the other end of which is jointed to the piston-rod *c* of an air-cylinder, F. One of these cylinders is located on each car, and is connected with the rock-shaft of that car, as just described, while a continuous line of pipe, *d*, Figs. 1 and 5, extends from cylinder to cylinder on the separate cars, and is coupled between the cars by a flexible connection, while said pipe at its forward end connects through a three-way cock with the air-brake cylinder G, Figs. 5 and 6, located on the cab of the locomotive. This air-brake cylinder is charged by a pump, in the usual way, through the pipe *e*, and the air is taken therefrom either to operate the air-brakes (not shown) through the three-way cock *f* and pipes f^1 f^2 f^3, or to operate the piston of the cylinder F through the three-way cock *g* and pipes g^1 g^2 g^3, the three-way cock being turned so as to let the pipes g^1 g^2 communicate when the pressure is to be applied to the piston, and be turned so as to let g^2 g^3 communicate when the air is to be exhausted and pressure relieved. Now, when the air is turned on at a given time, it will be seen that the piston in each of the cylinders F of all of the cars is forced outwardly and their several connections rock the shafts E of all of the cars, which shafts in each car release the locking devices of all of the sinking platforms, and allow them to drop to complete the electric circuits which are to effect

the registration. When the air is exhausted from the cylinders F their pistons are drawn back by the springs g^5, Fig. 5. At the same time that a platform falls the record is made by the electric circuit in the following manner: The contact-points *i j*, Figs. 1 and 2, which are closed by the depression of the platform, do not of themselves complete the electric circuit, but they are connected to wires *k l*, of which *k* goes to the magnet H, Fig. 2, thence to the battery, and thence to a rotary contact, I, Fig. 3, while *l* goes to a cylindrical non-conducting casing, J, and has a bearing-surface upon the inside, which is struck by the rotary contact in revolving. This rotary contact and its cylindrical casing are mounted on any suitable portion of the car, and to this cylinder comes the wires of each and every platform, seat, or other yielding support, only one set of wires, however, being shown, for the sake of avoiding complication. Now, when the platform descends and closes the contact-points *i* and *j*, it will be seen that even then the electric circuit is not completed until the rotary contact I touches one of the bearing-surfaces of the wires *l*. For the purpose, therefore, of separately closing the several circuits from the several platforms or other supports, it is necessary that the rotary contact should sweep around the inner periphery of the non-conducting cylinder, and for this purpose the shaft *m*, Fig. 1, carrying said rotary contact, is extended beyond the cylindrical case into a frame, and is provided with a pinion, 1, which is driven by a wheel, 2, which, in turn, is operated by a pinion, 3, and ratchet and spring mechanism *n*. To cause the rotation of the shaft to be effected simultaneously with the fall of the platforms, a notched disk, *o*, Figs. 1 and 2, is fixed upon the shaft *m*, which shaft is held against the tension of the coil-spring by a hook-shaped detent, *p*, on a rock-shaft, p^1, which rock-shaft has an arm, p^2. Connecting with the outer end of this arm is a wire or cord, *q*, which extends down beneath the floor of the car, and is attached to a lever, *q'*, whose end next to said cord is held up by a coil-spring, p^3, on the rock-shaft p^1. When this end of the cord is drawn down the detent *p* is withdrawn from the notched disk, and the spring mechanism causes the rotary contact to revolve.

The deflection of the lever *q'*, which releases the clock mechanism, is effected by the motion of the continuous shaft E in the following manner: Upon the end of the rock-shaft E is loosely placed a clutch-collar, *r*, Figs. 1, 2, 5, having ratchet-teeth upon both sides and tappets or cams on its periphery. A spring-detent, r^1, Fig. 1, engages with the teeth on one side to prevent back movement, while a pin or lug, r^2, Fig. 5, on the rock-shaft engages with the teeth on the other side of the clutch-collar. Now, the tappets or cams on the periphery of the collar being the same distance apart as the ratchet-teeth on the sides, it will be seen that at every oscillation of the shaft and descent of the platforms the lug r^2 on the shaft turns the collar and forces one of the cams or tappets beneath the inner edge of the lever *q'*, thus deflecting the latter, tripping the spring mechanism above, and rotating the contact I, the lever being restored to its position by a spring, p^5, Fig. 2, acting in unison with spring p^3 on rock-shaft p^1 above.

Every time the contact I is rotated and the battery-circuit is completed through the wires *l*, the armature k^3 of magnet H is attracted, and a point upon the end of the lever carried by said armature is made to indent or mark a roll of paper, L, Fig. 3, which passes from one roller, M, to another, M^1. To give motion to the paper simultaneously with the foregoing movements, the shaft of roller M^1 is extended at *s* into the frame of the spring mechanism, and is provided with a pinion, 4, which, through gears 5 and 7, derives motion from the coil-spring s^1, which coil-spring, like the one just below it, is fixed upon a shaft that has a squared end, and is arranged to be wound up like a clock mechanism. On the shaft *s* is fixed a notched disk, s^2, which is held by a hooked detent, s^3, and which detent is fixed to a rock-shaft, s^4, provided with a coil-spring, s^5, Fig. 1, that holds the detent into engagement with the notched disk. Projecting downwardly from the said rock-shaft is an arm, s^6, which is struck by the hooked detent *p* of the lower spring mechanism, to cause the paper-rolling mechanism to be operated simultaneously with the rotation of the rotary contact I and the movement of the recording-armature every time a platform descends.

As the wires from all of the contacts of the movable supports in the car are represented upon the non-conducting cylindrical drum in the shape of bearing-surfaces upon its inner periphery, it will be seen that the rotation of the contact I and the movements of the paper and recording-stylus causes as many distinct circuits to be made and as many separate dots to be recorded on the paper as there are movements of the sinking supports, whether these supports be in the nature of platforms in the floor, yielding seats, foot-rests, arm-rests, or the step of the car.

To indicate the time of the recording of the passengers, I arrange a clock, N, in a suitable place in the car, and the minute-hand shaft of the same I extend beyond the outside of the clock, as at *t*, Fig. 4. To the rear of this extension is coupled a spool, t^1, for winding a strip of paper from a second spool, t^2.

The spool t^1 is provided upon one side with a clutch, t^4, that engages with a clutch on the shaft *t*, and on the other side has a spiral spring, t^3, that holds the clutches engaged. This clutch and spring allow the spool to be withdrawn from the shaft, so as to permit the spool to rotate independently of the shaft to unwind the paper.

As the roll of paper runs from spool t^2 to spool t^1 it passes beneath the bar *u*, Fig. 2,

and at this point a stylus, fixed upon the end of an armature-lever, w', bears against the paper whenever the circuit is closed through the magnet O. This magnet operates the time-stylus, and said magnet is connected with the battery as follows: One wire, v, leads to one pole of the battery, and the other wire, w, leads to the cylindrical drum J, Figs. 1, 2, 3. When, therefore, the rotary contact I is moved around the cylinder by the movement of the spring mechanism started by the rotation of shaft E, as soon as the rotary contact I touches the bearing-face of wire w the current then flows from the battery through wire v to the magnet O, thence through wire w to the cylindrical drum, and thence through the rotary contact and down the wire k to the battery again.

It will thus be seen that if the time of the route be laid off on the paper roll in hours and minutes, whenever a record is made of the passengers—say, 10 o'clock—the reel attached to the clock will have at that time unwound enough of the paper to cause the part marked 10 o'clock to be just beneath the recording-stylus of lever w' at that time. This roll of paper giving the time record then, in connection with the roll of paper containing the record of the individual passengers, with the stations marked therein, furnishes data whereby the number of passengers traveling between any two points may be easily determined, thus acting as an effectual check against fraud on the part of the conductor.

In providing means for the removal of the roll of paper containing the registered marks, the two rods M M^1 are arranged in bearings in a hinged folding frame, M^2, Fig. 1, which is unfolded and the rolls removed when the end of the route is reached, and a new set of rolls and length of paper substituted.

With the recording apparatus described, I propose to connect by wires not only the sinking platforms, but also the yielding seats B, with foot-rests C, the yielding arm-rests P, and the outside steps Q.

With respect to the yielding seats I do not claim the arrangement of them as new, as such arrangement is shown in my prior patent.

In arranging the foot-rests, however, with respect to the seats both ends of the foot-rest are made exactly alike, with laterally-projecting pins x and eyes x^1, Fig. 1, and bars x^2 are provided, which extend from the middle of one seat to the middle of the next, and have bearings at their ends, which support the pins of the foot-rests. This is to adapt the same set of foot-rests to the seat when the backs are reversed. Thus, when the car is moving in the direction of the arrow in Fig. 1, the rear ends of the foot-rests are raised and hooked beneath the seats, and the front ends rest upon the pins in the bearings beneath the center of the seat in front, while, when the backs of the seats are reversed and the car is going in the opposite direction, that which was the front ends of the foot-rests is raised, as shown in dotted lines, and hooked to the bottom of what was the next seat in front, and the other end then rests upon the pins in the bearings.

The yielding arm-rests P, Figs. 1 and 3, are designed to be provided with electrical contact-points, which, when brought together, make a record in substantially the same manner as before described. These prevent persons from sitting upon the arm-rests, in which position they would not be registered. As a modification of this feature, points y, Fig. 3, or edges, may be made to protrude through holes in the arm-rests by the descent of the yielding top portion to secure the same effect.

With respect to the yielding step outside of the car, I am aware that a step has been made yielding and combined with mechanism to secure the registration of the passengers, and I do not claim such broadly.

In my case the steps are hinged at their back edges, as shown in Fig. 2, and at their front edges are held up by springs, and are also provided with a locking-bolt, z, which normally holds the step rigid, but which bolt is connected, by a cord, z', with the continuous shaft E, so that when this is rocked the bolt is withdrawn, and the step allowed to descend, and, by closing an electric circuit, register the passenger who may be standing thereon in the manner before described.

Having thus described my invention, what I claim as new is—

1. The combination, with the yielding supports, provided with locking devices, and the continuous rock-shaft for releasing said locking devices, of the air-cylinder and piston connected with said shaft so as to rock it, and a mechanism for supplying compressed air to said cylinder, substantially as shown and described.

2. The combination, with one or more sinking supports arranged to connect electrical contact-points, of one or more magnets arranged in the circuit of said contacts, and provided with a recording-armature, together with a roll of paper and a spring mechanism for moving the same, a non-conducting cylindrical drum or commutator having wires leading to the several sinking supports, and a rotary contact arranged within the same, and operated at intervals by a spring mechanism, the said paper-moving mechanism and rotary contact mechanism being connected with and set in operation by the same mechanism which releases the locking devices of the sinking platforms, as herein described.

3. The combination, with a clock having the shaft of one of its wheels extended, of a paper-winding reel or spool having a clutch-coupling for connection with said shaft, to permit the rotation of said reel independently of the shaft, as and for the purpose described.

4. The combination, with the arm-rest of a car or analogous vehicle, of a movable top section for said arm-rest, substantially as and for the purpose described.

5. The bars x^2, fixed to the floor and extending from the middle of one seat to the mid-

dle of the next, and having bearings at each end, as shown, in combina ion with the foot-rests, extending also from the middle of one seat to the middle of the next, and constructed at each end with a corresponding eye, x^1, and laterally-projecting pin $x\,x$, to adapt said foot-rests to the reversal of the backs of the seats, as described.

6. The combination, with the detent for releasing the recording mechanism, of the cord q, the lever q', held up by a spring, the rock-shaft E, having lug r^2, and the loose collar r, having ratchet-teeth upon each side and cams or tappets upon its periphery, together with a detent for said collar, substantially as described.

The above specification of my invention signed by me this 7th day of June, 1879.

S. B. CRANE.

Witnesses:

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SOLON C. KEMON.