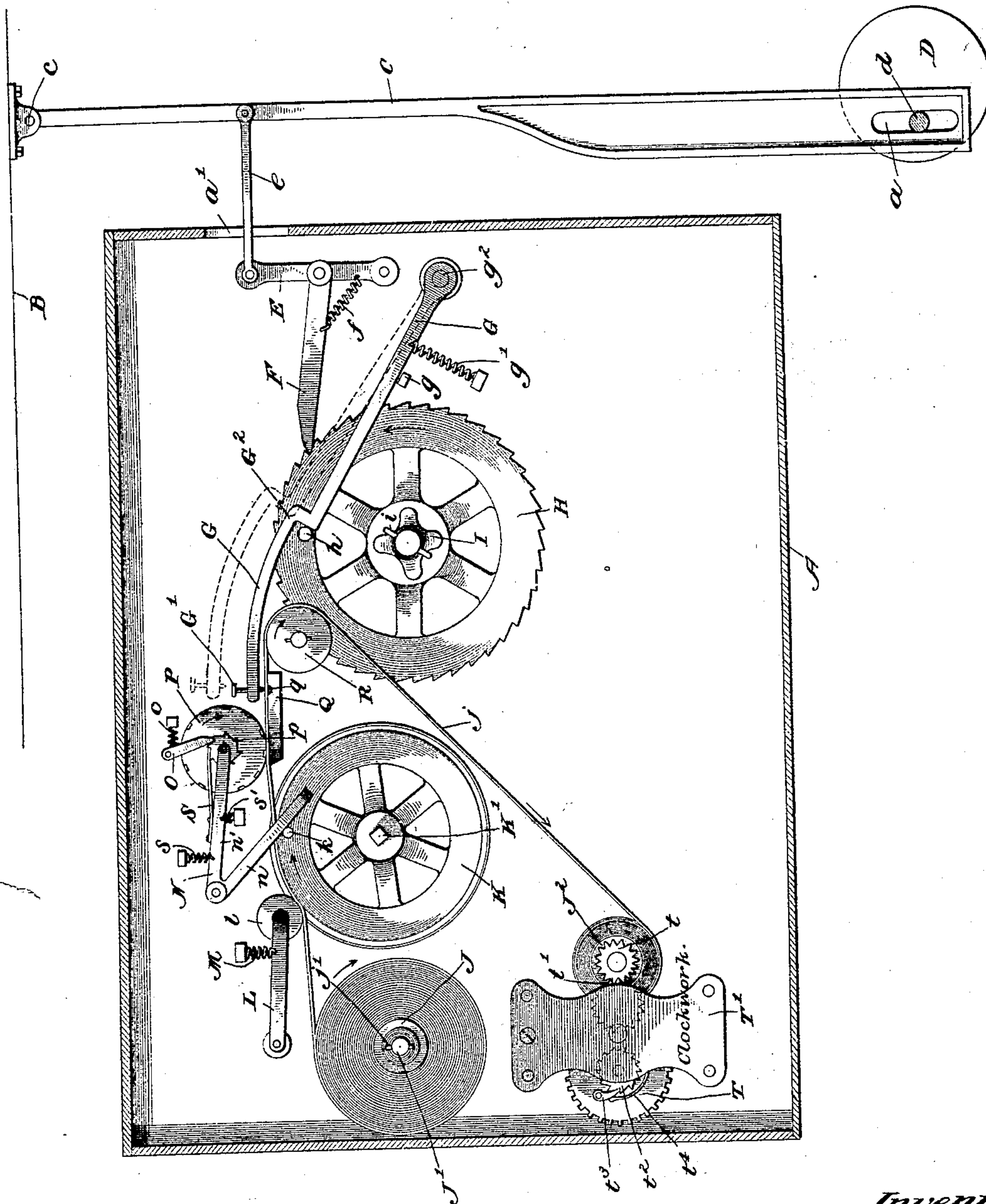


(No Model.)

J. SPENCE, Jr.
SPEED RECORDER.

No. 559,627.

Patented May 5, 1896.



Attest.
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UNITED STATES PATENT OFFICE.

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SPEED-RECORDER.

SPECIFICATION forming part of Letters Patent No. 559,627, dated May 5, 1896.

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To all whom it may concern:

Be it known that I, JAMES SPENCE, JR., a citizen of the United States, residing at Houston, in the county of Harris and State of Texas, have invented certain new and useful Improvements in Speed-Recorders; 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.

This invention relates to an improvement in speed-recorders or devices used for the purpose of indicating the speed of a car or other vehicle, my improvements being particularly applicable for use upon street-cars.

One object of the invention is to provide a safeguard for the company against reckless and unreliable motormen, who often run the car at a greater speed than is allowed by the rules of the company.

By the use of my invention the speed at which the car is run during its entire course can be accurately ascertained. The exact time which the car makes on each block can be determined by a simple inspection of the paper ribbon or tape, which is punched during the movement of the car. Also my device will show how long the car may have stood at any given point. Thus valuable evidence in suits for damages against railway companies may be provided, both for and against the company, where the question of the speed of the car is a matter in issue.

The invention consists, therefore, in the construction, arrangement, and combination of parts, substantially as will be hereinafter described, and then more particularly claimed.

In the accompanying drawing, the figure represents an elevational view of my improved speed-recorder, with the box which incloses the various mechanical parts shown in section.

A designates the inclosing box. This may be dispensed with, if desired, but I generally prefer to have it because it is best to have the mechanical parts inclosed within a casing, which will keep them free from dust and interference. This box A is preferably located beneath the floor of the car or other vehicle B, although I do not wish to be restricted to this position inasmuch as the box A may, if

preferred, be situated anywhere in the vehicle.

In the present example of my invention I assume that the speed-recording mechanism is situated below the car-frame.

C designates a depending arm, which hangs below the car-floor B, being pivoted thereto at the point *c*, and having at its lower end a vertical slot *a*, which is entered by the pin *d* on the car-wheel D, so that as said wheel rotates the depending arm or lever C vibrates or oscillates to and fro. This lever C is the prime mover of the speed-recording mechanism, and its oscillations set said mechanism into motion and produced the recording results in the manner to be presently explained. A link *e* is pivoted to the depending arm C at a suitable point, and this link passes through a slot *a'* in the side of the casing A, and within said casing A the end of the link *e* is pivoted to the side or back of the box A, as shown in the drawing. This lever E carries pivoted thereto a pawl or finger F. A spring *f* is attached to pawl F and also to lever E near its lower pivotal point, and this spring operates to normally draw the pawl F downwardly, as shown. The pawl F engages the teeth of the ratchet-wheel H, which is supported loosely upon a post fixed in the wall of the casing A, so that the ratchet-wheel H may loosely rotate thereon. The pawl F prevents any back movement of the wheel H, which latter rotates forwardly in the direction shown by the arrow.

On the journal-post of the ratchet-wheel H is a flat tension-spring I, which bears against the hub of the wheel H in order to prevent it from turning too fast, and in the end of the journal-post is a cross-pin *i*, which holds the spring I tightly against the hub of the wheel, as is clearly shown in the drawing, said spring I having also the function of keeping the ratchet-wheel upon its axle or journal-post. In the face of the wheel H near its toothed periphery is a horizontal projecting pin *h*, which bears against the under side of the punch-lever G, raising the same at each rotation of the ratchet-wheel. This punch-lever G is of an elongated form, and is pivoted by means of the journal *g*² to the wall of the casing A, preferably near the point

where the lower end of the lever E is pivoted. A spring g' is fastened to the under edge of the lever G and at its opposite end to the point on the wall of casing A, and such spring operates to normally draw the lever G downward, said downward movement being limited by the fixed pin g in the wall of casing A, on which the lever G normally rests, as shown in full lines in the figure of the drawing, and above which pin g the lever is adapted to be intermittently lifted into the position shown in dotted lines in the drawing in consequence of the movement of the ratchet-wheel H and the action of the pin h against the under edge of said lever G. At a point about midway of its length the lever G is bent or formed with a right-angled shoulder G^2 . The free end of lever G is provided with a punching device consisting, preferably, of an adjusting-screw G' , which passes through the end of the lever and projects beneath the same into position where it can act to punch the paper strip placed beneath it. It will be obvious that as the ratchet-wheel H rotates, the pin h will, during each rotation of said wheel, act against the under side of the lever G to lift the same, and this lifting process will continue until the pin h passes the shoulder G^2 , when the lever G will suddenly drop back into its normal position again, and the punching device G' falling thus quickly will strike against the paper strip beneath it and punch a hole therein.

Q designates a punching-block, supported in any suitable manner directly beneath the free moving end of lever G, which carries the punching device G' . This punch-block Q is provided with a small groove or recess q , which is adapted to receive the lower end of the punching device G' .

K designates a wheel which I term the "time-wheel." It rotates once every hour. It is propelled by means of any ordinary and suitable clock mechanism—as, for instance, the mechanism of an ordinary one-dollar alarm-clock. This time-wheel K has at its central point a post K' , which is connected with the post in the alarm-clock that turns the hour-hand, and in this way the time-wheel is rotated once every hour.

Bearing against the lever of the time-wheel K is a tension-wheel l , located directly above the time-wheel and at the left thereof, the same being supported in an arm or clevis L, which is pivoted at its rear end to the wall of the casing A, as is clearly shown, said clevis being normally pressed downward by means of a small helical spring M, which bears against the upper edge of clevis L and is also attached in some convenient way to the wall of the casing A. In this way the wheel l is held yieldingly against the edge of the time-wheel K, or rather against the paper strip which passes between the two walls. j denotes this paper strip or ribbon, which is held by the yielding roller l with the same force at all times against the periphery of wheel K.

J denotes a small wooden spool, around which the ribbon j is wound to form a spool of paper or ribbon, said central supporting-spool J being held upon the axle passing through its center, upon which axle it is rotatable in order that the paper ribbon may freely wind off from it. At the ends of the spool J is a tension-spring J' , which bears against the end of the spool and prevents the paper ribbon from unwinding faster than it should. In the end of the axle which supports this spool is a pin j' , which bears against the spring J' and keeps the latter in place, besides keeping the spool in position upon its spindle.

R denotes a loose idle-pulley rotating on a small stud or axle attached to the rear wall of casing A, and around this pulley passes the ribbon j . Pulley R is located at a point contiguous to the punching-block Q. The ribbon j as it passes off the periphery of time-wheel K passes over the punch-block Q and then over the idle-pulley R. It then leads downward to the spool J^2 , which is used for winding it up. The ribbon, therefore, which has been punched during its passage over the punch-block and which, therefore, has had a record made thereon, will be wound up on the spool J^2 . This spool is mounted upon an axle having a cog-wheel t , which engages with the cog-wheel t' , by means of which it is propelled. The mechanism of an ordinary spring alarm-clock may be used for the purpose of rotating the spool J^2 for the purpose of winding the ribbon thereon. In the drawing I have represented a portion of the mechanism of such a clock, but it is unnecessary to here describe the same minutely.

T' denotes a supporting-plate, which is attached to the wall of the casing A.

T denotes the large gear-wheel of the clock-train; t^2 , a ratchet-wheel on the shaft of said large gear; t^3 , a pawl engaging said ratchet, and t^4 a spring operating against said pawl. It is sufficient to state that this clock mechanism imparts to the ribbon-spool an even movement, so that the ribbon may be neatly wound thereon.

P denotes the stamping-wheel. It is provided on its periphery with a series of figures running from "1" to "12," inclusive, which figures may be made of rubber or any other suitable material, and are adapted to stamp the paper ribbon j as it passes over the punch-block Q. It will be noted that the stamping-wheel P is supported above the punch-block Q.

N denotes a two-armed or forked lever having the arms n n' and pivoted at the junction of said arms to the wall of casing A. The arm n extends downward alongside of the time-wheel K in such a position that a pin k in the face of wheel K may be brought into contact with said arm n during each rotation of wheel K. The arm n' carries in its outer end the stamping-wheel P, the same being journaled in the arm as shown. The journal of the wheel P is provided with a ratchet-

wheel *p*. This ratchet-wheel is engaged by a pawl or tooth *O*, which is pivoted to the rear wall of the casing *A* and is acted on by means of a spring *o*, bearing against the side of the pawl and also fixed at a point to the casing *A*, so that the pawl *O* will be kept in engagement with the teeth of the ratchet *p*. On the upper edge of the arm *n* is a spring *S*, which is fixed thereto and the end of which is free and engages like a pawl the teeth of the ratchet-wheel *p*. Also on the upper edge of the arm *n'* is a small coiled spring *s*, which bears downwardly thereon and is tensioned against a point or projection on the wall of casing *A*. On the under side of the arm *n'* is another spring *s'*, the action of which is to lift the arm *n'* and cause a rebound of the stamping-wheel of the ribbon *j*. While, therefore, the spring *S* acts to force the arm *n'* quickly downward and thereby cause the stamping-wheel *P* to stamp the ribbon, the spring *s'* has the converse action of causing a rebounding of the stamping-wheel off the ribbon. Each time the time-wheel *K* rotates, which, as we have seen, is once every hour, the pin *k* acts against the arm *n*, thereby lifting the same and consequently lifting the stamping-wheel *P*, and in such lifting causing said wheel to be rotated one notch of the ratchet-wheel *p*. When the pin *k* is released from the end of the arm *n*, the spring *s*, acting against the arm *n'*, will force the stamping-wheel quickly downward and cause an impression to be made upon the ribbon *j*. Thus it will be seen that the stamping-wheel will be rotated one-twelfth of a rotation each hour. Consequently its active figure or the figure which will make an impression upon the ribbon *j* will be changed each hour. The hours will therefore be marked uniformly in a regular series upon the ribbon *j* at uniform distances apart in consequence of a uniform traveling of the ribbon and the uniform stamping action of the stamping-wheel. The object of this stamping-wheel will therefore be easily understood as being the indication of the time of day that each portion of the paper passes through under the punch-pin in the end of the punching-lever.

We have already perceived the action of the punching-lever in punching a series of holes in the ribbon. The faster the car travels the more holes will be punched. When the car stands still, no punching will take place, although the ribbon *j* will be traveling all the while, and the length of time during which the car will thus rest will be indicated by an observance of the time-marks on said ribbon. If the car should run extremely fast, the holes punched therein would be very numerous, and the time at which such acceleration of speed took place will be easily determined by an observance of the time-marks.

It will thus be seen that by my improved and simplified speed-recording mechanism the railway company will be able to ascertain accurately and definitely the manner in which its cars are propelled at all times of the day.

I do not wish to be confined to the exact construction and arrangement of the parts shown in the drawing, but reserve the liberty of varying therefrom as may be found requisite.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a speed-recorder, in combination with a traveling ribbon, of a vertically-reciprocating punching device provided with a central offset, and an adjustable pin for piercing said ribbon with a series of holes, means for engaging the central offset in said lever to operate the same, a clock mechanism for imparting a regular continuous movement to the traveling ribbon, and a stamping device for providing said ribbon with time-marks, substantially as described.

2. In a speed-recorder, the combination of the ratchet-wheel having a projecting pin thereon, means for operating said wheel, a vertically-reciprocating punching-lever provided with a central offset, and an adjustable pin, the offset being engaged by said pin to operate said lever, a punch-block, a traveling ribbon, and a time-stamping device operating above the punch-block, substantially as described.

3. In a speed-recorder, the combination of the ratchet-wheel having a projecting pin, a feed-pawl for said ratchet-wheel, a vertically-reciprocating punching-lever provided with a central offset and having a punch device, said lever being operated by the said pin, a traveling ribbon, a time-wheel having a projecting pin, a stamping device supported in a frame actuated by said pin, substantially as described.

4. In a speed-recorder, the combination of a traveling ribbon, a vertically-reciprocating punching device having a central offset and an adjustable pin operating thereon, a time-stamping mechanism consisting essentially of a pivoted frame, a time-wheel having a pin engaging said frame, a stamping-wheel supported in the frame, and a pawl-and-ratchet mechanism operating in connection with said stamping-wheel to allow a partial rotation of the wheel each hour, substantially as described.

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

JAMES SPENCE, JR.

Witnesses:

T. B. WILLIAMS,

J. D. WOLVERTON.