3 Sheets—Sheet 1.

J. D. RICHARDSON.

Speed and Time Recorder.

No. 219,527. Patented Sept. 9, 1879.

Fig. 1.

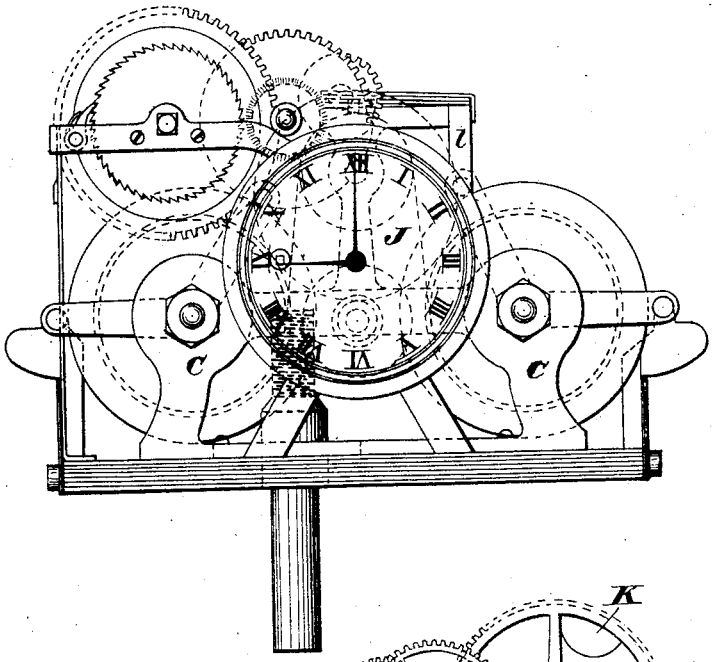
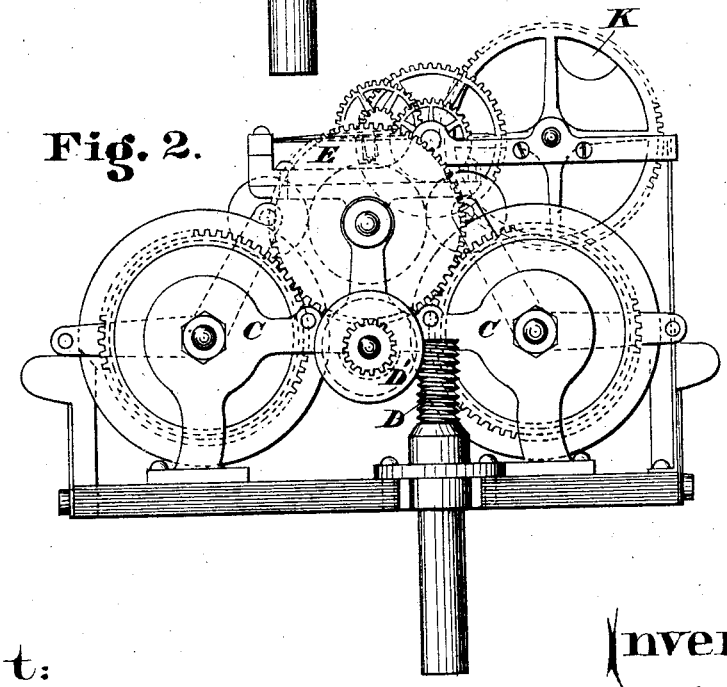


Fig. 2.



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Inventor:
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Attorney.

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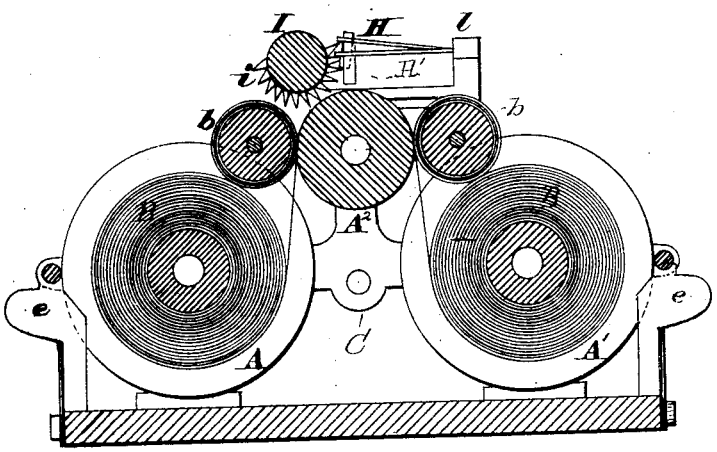
Fig. 3.



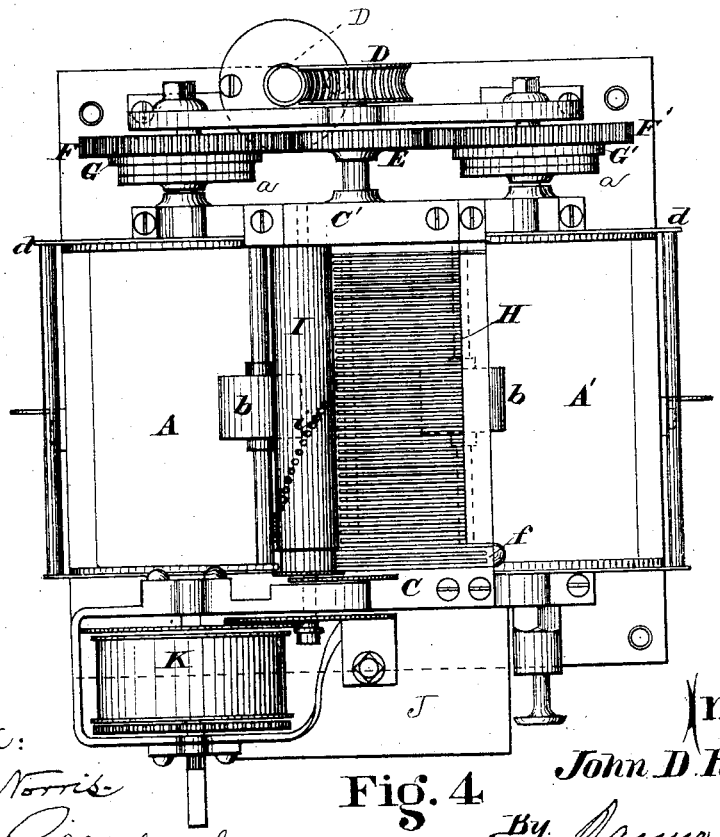


Fig. 4.

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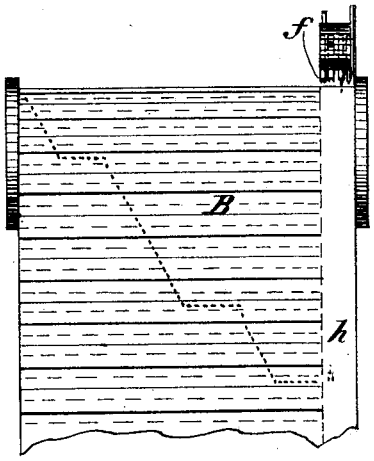

Fig 5

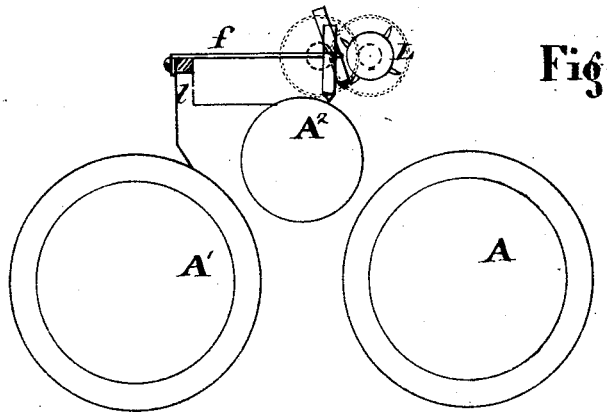

Fig 6

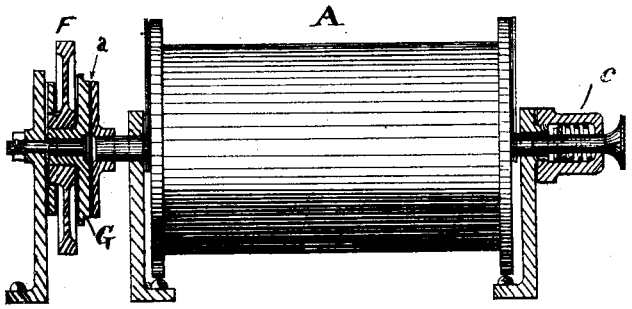

Fig 7

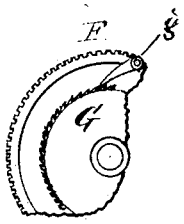

Fig 8

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UNITED STATES PATENT OFFICE.

JOHN D. RICHARDSON, OF HOUSTON, TEXAS, ASSIGNOR TO HIMSELF AND MILTON G. HOWE, OF SAME PLACE.

IMPROVEMENT IN SPEED AND TIME RECORDERS.

Specification forming part of Letters Patent No. **219,527**, dated September 9, 1879; application filed April 15, 1879.

To all whom it may concern:

Be it known that I, JOHN D. RICHARDSON, of Houston, in the county of Harris and State of Texas, have invented certain new and useful Improvements in Recording Instruments, of which the following is a specification.

The object of this invention is to provide a mechanism for producing a perfect indelible record of all the movements of a locomotive while in charge of the engineer, to record any stoppages that may be made, the duration of such stoppages, and any backward motion of the locomotive at any point during the trip.

To this end my invention consists, first, in a continuously-moving chart, operated by suitable gearing actuated by the wheel of a locomotive or car, in combination with a series of punches arranged transversely across the chart, and a transverse drum, having a series of spirally-arranged projections located adjacent to the punches for operating directly on the same, and operated to punch the chart transversely, as more fully hereinafter described; second, the combination, with the drums carrying a movable chart and suitable mechanism actuated by the wheel of the locomotive or car to move said drums, of a series of transverse punches and a transverse drum, actuated by clock-work, and provided with a series of spiral projections arranged adjacent to the punches, to operate directly on the same, and a puncturing device operated by the clock-work, to puncture the edge of said chart to indicate the time of travel, as more fully hereinafter described.

Referring to the accompanying drawings, Sheet 1, Figure 1 is a front elevation of my recording instrument as viewed from the side where the time mechanism is applied. Fig. 2, on the same sheet, is an end elevation of the same viewed from the rear of the machine. Fig. 3, Sheet 2, is a transverse sectional elevation of the same. Fig. 4, Sheet 2, is a plan view. Fig. 5, Sheet 3, is a partial elevation, showing the chart and the manner of puncturing it. Fig. 6 is a partial view for the purpose of showing the puncturing device used to indicate every third hour upon the margin of the chart; and Figs. 7 and 8 of same sheet are views of one of the friction-rollers upon which the chart revolves and gearing by which they are operated.

In the drawings letters of like character indicate corresponding parts in each of the figures.

The friction-rollers A A^1 A^2, upon which the chart B revolves, are journaled to standards C and C′, and are operated by a system of gearing connecting a worm and worm-wheel, D and D′, with one of the wheels of a locomotive or car. The gear-wheel E, which transmits motion from the worm-gear D and D′ to the gear-wheels F and F′ and to roller A^2, is firmly secured to the shaft of roller A^2, while the wheels F and F′ are each provided with additional ratchet-wheels G and G′, which they control by means of pawls *g*; and these ratchet-wheels, in their turn, by means of friction-pads *a*, interposed between the abutting surfaces of the friction-rollers A and A^1 and ratchet-wheels G and G′, operate the said rollers in the desired direction, and yet allow the rollers A and A^1 to remain stationary when the regular motion is reversed. The abutting surfaces of rollers A and A^1 and ratchet-wheels G and G′ are kept in close contact by the agency of spring *c*.

The rollers *b* and *b* are journaled upon swinging brackets *d* and *d*, and are used to press against chart B and roller A^2, and are held in position by swinging supports *e* and *e*, which also secure the chart-rollers in their journal-bearings.

The points H, used to puncture the chart B to record the working of the locomotive, are, in this case, sixty in number, and are arranged so that one will operate every minute of time, and as each is independent of the others it requires one hour to operate the whole. The puncturing-points H are located in a line parallel with the mile-lines upon the chart B, and are so located as, when liberated, to come in contact with the chart B as it passes over roller A^2, and there punctures it. The points H are made of steel in this case, and are fastened at one end by line-springs to a common sustaining-bar, *l*, attached to standards C, and are of sufficient length to permit

them to spring away from a cam-roller, I, and are fitted with a number of puncture-points, H′, which are liberated by the cams *i*, when they spring against the chart and puncture it.

The cam-roller I is driven by a clock, J, and auxiliary spring K. (In practice spring K may be omitted, and the clock-spring made sufficiently strong to do the work alone.) Gearing to the cam-roller I is a separate cam, L, provided with four cam points or projections, which operate four separate puncture-points, *f*, used to puncture the chart B on its margin *h*, in this case every third hour, but which may be varied at pleasure without destroying the usefulness of the instrument.

The operation of this machine may be briefly described as follows: The chart B is spaced and ruled so that each line upon the same represents miles and fractions of miles, and is placed upon rollers A and A^1 and A^2, and moved by a system of gearing attached to a wheel of a locomotive or car. The puncture-points H′, being operated by cams or projections *i* on cam-roller I, descend, one at a time, every minute, and puncture the chart in a line parallel with the lines upon the chart during the time the locomotive is sta ionary, and in an oblique line while it is in motion, the variations of the punctured lines and number of punctures in any mile on the chart indicating the speed of the locomotive or car. The gearing operating the cam L and points *f* causes the said cam to operate one of said points at the same time the cam I is completing its third revolution, and thus records upon the margin of the chart four marks every twelve hours, said puncture-points being shaped so as to indicate in the chart which of the four has descended and made the impression.

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

1. A continuously-moving chart operated by suitable gearing actuated by the wheels of a locomotive or car, in combination with a series of punches arranged transversely across the chart, and a transverse drum, having a series of spirally-arranged projections, located adjacent to the punches for operating directly on the same, and operated to punch the chart transversely, substantially as and for the purpose described.

2. The combination, with the drums carrying a movable chart and suitable mechanism actuated by the wheel of the locomotive or car to move said drums, of a series of transverse punches and a transverse drum actuated by clock-work, and provided with a series of spiral projections arranged adjacent to the punches to operate directly on the same, and a puncturing device operated by the clock-work to puncture the edge of said chart to indicate the time of travel, substantially as described, and for the purpose set forth.

In testimony whereof I have hereunto set my hand this 21st day of February, 1879.

J. D. RICHARDSON.

Witnesses:

M. G. HOWE,

J. O. CARR.