3 Sheets—Sheet 1.

W. W. WYTHE.

SPEED-RECORDER.

No. 173,251. Patented Feb. 8, 1876.

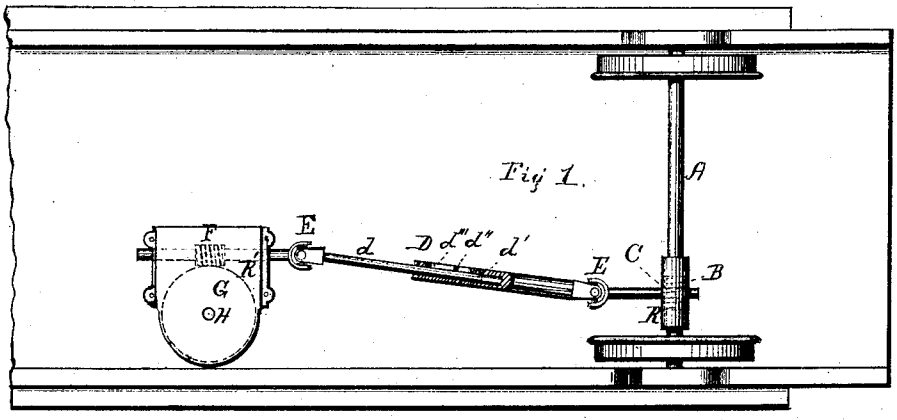

Fig. 1.

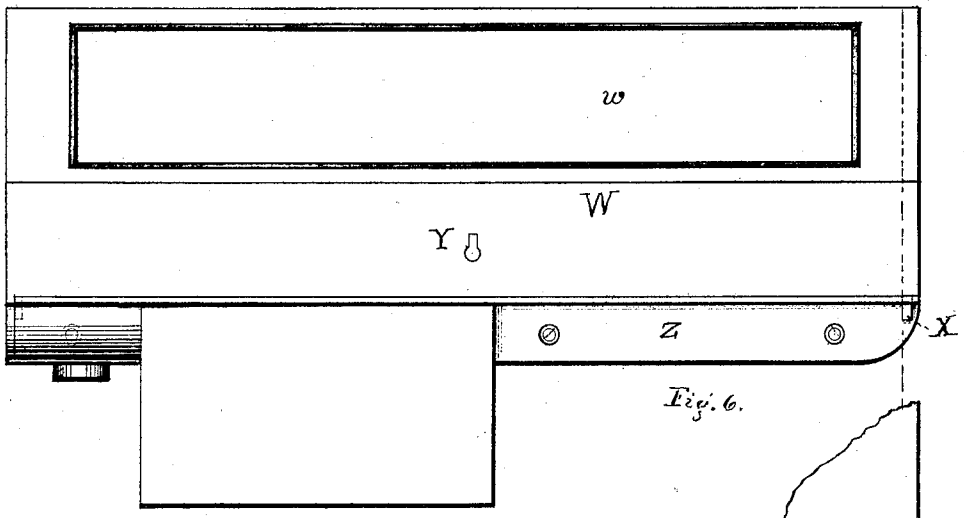

Fig. 6.

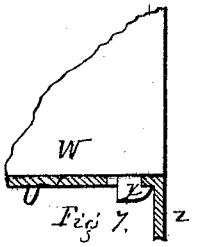

Fig. 7.

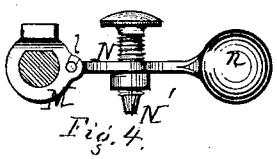

Fig. 4.

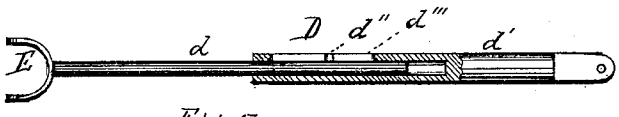

Fig. 5.

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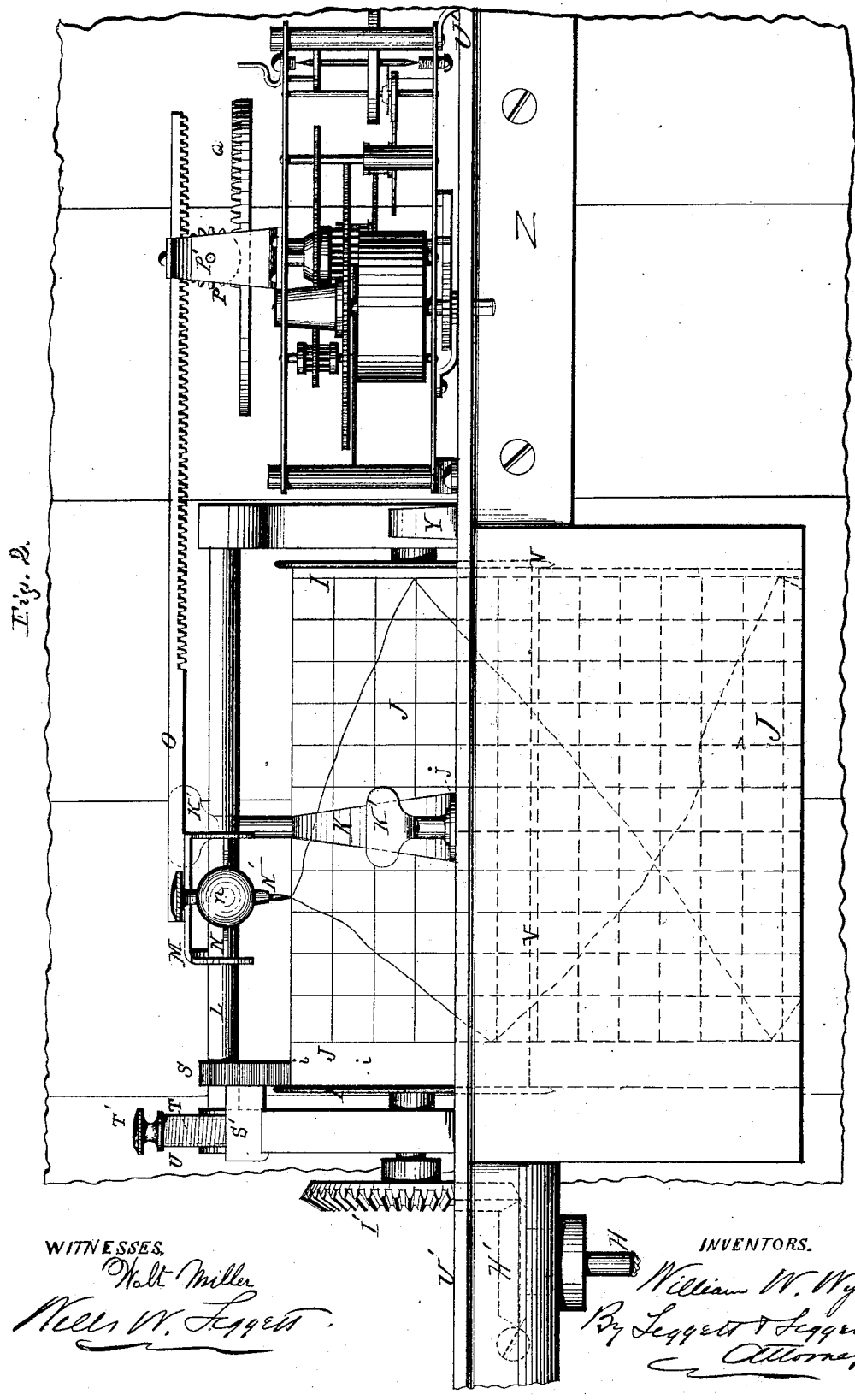

Fig. 2.

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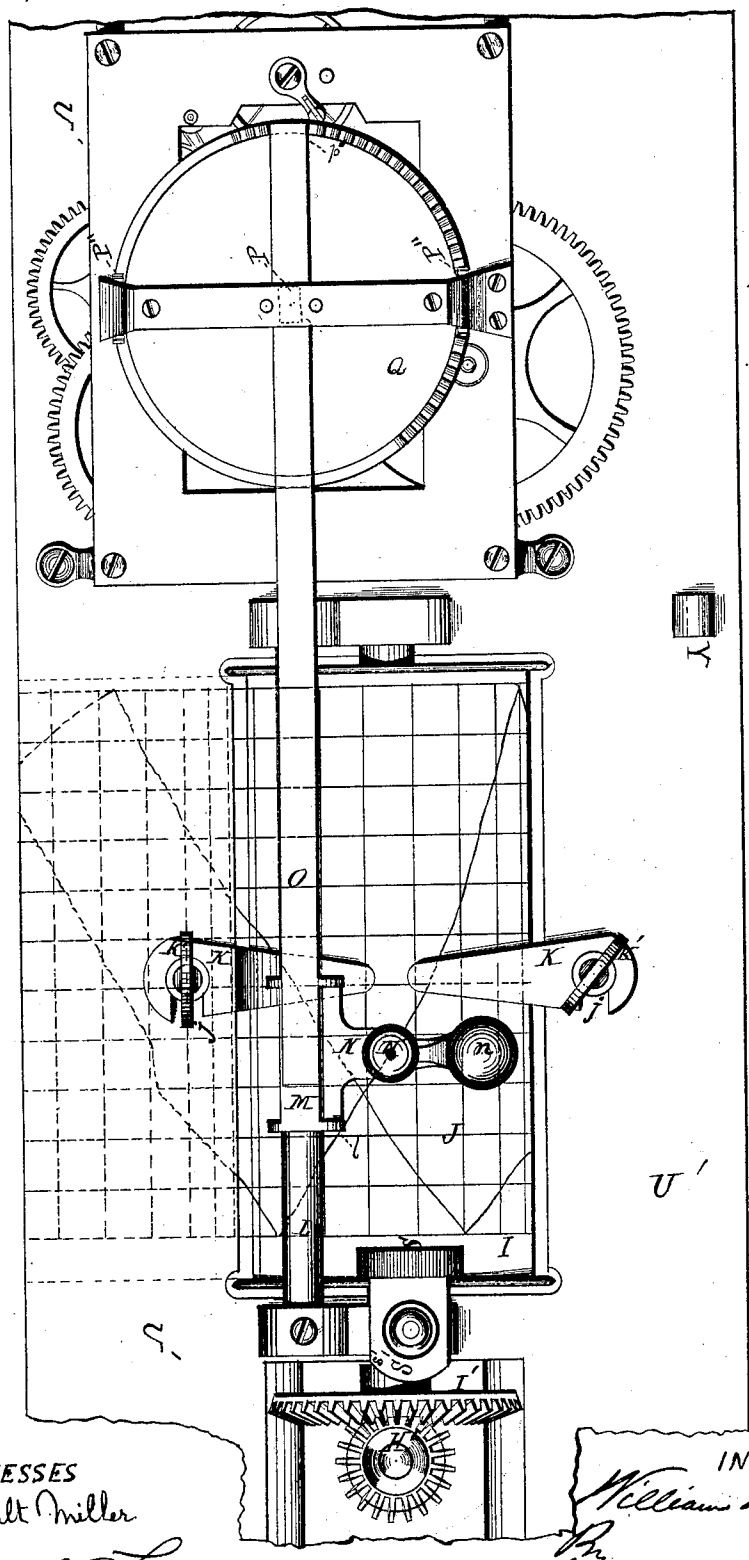

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UNITED STATES PATENT OFFICE.

WILLIAM W. WYTHE, OF ERIE, PENNSYLVANIA.

IMPROVEMENT IN SPEED-RECORDERS.

Specification forming part of Letters Patent No. **173,251**, dated February 8, 1876; application filed February 24, 1875.

To all whom it may concern:

Be it known that I, WILLIAM W. WYTHE, of Erie, in the county of Erie and State of Pennsylvania, 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 pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to speed-recorders, &c., for railroad-trains, and is designed as an improvement upon the machine patented to me July 28, 1874, No. 153,470, for speed-recorders for railroad-trains.

My invention relates more particularly, first, to the combination, with the said mechanism, of boxes for inclosing the mechanism beneath the car, whereby all grit and foreign substances are excluded therefrom; second, in an extension-shaft connecting the worm-wheel on the car-axle with the recording mechanism, whereby any variation of the distance between the two caused by the partial revolution of the car-truck upon its pivot, as in turning of curves, is compensated by the extension-shaft; third, in attaching a pencil upon a weighted lever; fourth, in a novel means whereby the pencil is attached to the rack, so as to readily admit of removing the same; fifth, in metallic side clamps and set-screws for holding the paper to the drum; sixth, in an adjustment of the friction-roller, whereby it can be readily thrust aside and off from the drum; seventh, in providing the chart with the names of stations, localities, and curves, &c.; eighth, in an improved frame or stable, upon which the recording mechanism is secured, and the cover for the same, all as hereinafter more fully set forth and claimed.

In the drawing, Figure 1 is a view looking upward against the bottom of the car. Fig. 2 is a side elevation of the inside of a car bearing said improvement. Fig. 3 is a plan view of the recording mechanism with the cover removed. Fig. 4 is a separate view of the end of the rack-bar and the pencil attachment. Fig. 5 is a separate view of the extension-shaft in section. Fig. 6 is a separate view of the box or case that incloses the recording mechanism. Fig. 7 is a cross-section through one of the hinges whereby the cover is attached to the said box.

In the several drawings similar letters represent similar parts.

A is a car-axle, provided with a worm. B. It is arranged to gear into the wheel C. D is an extension-shaft, composed of an inner shaft, d, and outer shaft, d', stop d'', and slot d'''. F is a bevel-wheel, gearing into the bevel-wheel G, located at the bottom of the vertical shaft H. H′ is a bevel-wheel at the top of the shaft H, which gears into the bevel-wheel I′, that carries the drum I. J is the chart, located upon the side of the drum. K K are metallic clamps that hold the paper or chart to the drum, which clamps are provided with set-screws K′, to hold them in position. L is a guide-bar, upon which slides the yoke M, that is attached to the end of the rack-bar, and also bears the pencil-lever N and the pencil N′. O is the rack-bar. This bar is driven by suitable clock-work.

The method of driving the bar (shown in the drawings) is by a central pinion, P, on a shaft, P′. This central pinion is driven alternately in opposite directions by the mutilated gear Q, which meshes alternately with the pinions P″ at opposite ends of the shaft P′. The mutilated gear Q is given a regular uniform motion by suitable clock-work. E are universal joints, located at the ends of the extension-shaft D.

These joints may be of any suitable form, so as to permit the shaft D to flex at these points. They may be either in the form shown, or they may be in the form of a spiral coil, hook-joints, or any other suitable form. So, also, instead of employing the extension-shaft D in the form shown, it may be of any suitable construction, the idea being to unite the worm-gear upon the shaft with the gear F at the bottom of the shaft G by a flexible coupling, and one that will also yield in the direction of its length, and of sufficient stiffness to communicate the motion of the axle to the shaft G; and it is obvious that this may be done in a variety of ways without departing from the principle of my invention.

R and R′ are boxings that are designed to exclude dust and other grit from the working

parts which they inclose. S is a friction-roller, which presses the paper down against the drum I, and causes it to be pierced by the points *i*. The roller S is attached to the block S′, which is shouldered down upon the frame. This block is pivoted to the stem T, which bears the spiral spring, or its equivalent, U. This spring is made to exert a greater or less degree of pressure upon the block S′ by means of a nut, T′, that runs up and down upon the stem T.

The block S′ is rounded off at *s′*, so that when raised free from its bearing upon the frame, the said block, together with the friction-roller S, can be turned aside off from the drum I.

The clamps K are designed to hold the paper or chart snugly against the drum I, so that it will not be disturbed by the pressure of the pencil upon it. These clamps are slotted at *j*, so that they may be removed by simply loosening their set-screws.

The yoke M is provided with bearings for the weighted lever N. One of these bearings, *l*, is provided with an open slot, whereby the weighted lever N may be readily removed from the yoke M. The free end of the lever N is provided with a weight, *n*, which projects out beyond the pencil N′. The object of this weighted lever is twofold: first, it gives the pencil a firm bearing upon the chart, so as to make a distinct and positive line; second, it serves to indicate bad parts of the track over which the train is passing, and, through the construction of the chart itself, it serves to locate these bad points. It also serves to give the location of frogs, to indicate a bad section of roadway, &c. It operates in the following manner:

If, for instance, the joint between two rails should become loosened, so as to cause the rails to have a shearing motion at the joint, the car, in passing over this point, would receive a sudden jolt. This jolt would cause the weighted lever to jump, and would mark a black spot upon the line drawn by the pencil. So, also, the same thing would occur in crossing a frog; and in passing along a bad section of a roadway or track, these dots would come in such rapid succession as to leave a line much heavier and blacker than would be made in passing over a smooth track. The chart, by its construction, would indicate the exact location of these dots or darkened lines.

U U′ is a stand or frame, upon which the clockwork and recording mechanism are located. It is provided with suitable recesses for the gearing and for the drum I; and beneath the drum it is provided with a chute, through which the paper is received by the drum and passes from the drum.

V is a skimmer, located below the drum I, for the purpose of loosening the paper from the points *i*. W is a cover, consisting of a frame-work with glass plates, *w*, through which the mechanism can be seen. X are lugs cast upon the said cover, which lugs hinge into corresponding orifices in the stand U′. Y is a lock and key, located in any suitable position for locking the cover to the frame. The frame is arranged to be fastened to the side of the car by the screws, which pass through a flange, Z, upon the back of the said stand or frame.

The foregoing description is sufficient to indicate the construction of the device, as well as its operation. It only remains, therefore, to describe the chart. The chart is similar to the one described by me in the Letters Patent hereinbefore named. It is ruled longitudinally to indicate distances, and laterally to indicate the stations, the localities of curves, switches, tanks, &c. Should the drive-wheels of the locomotive slip, the time, the locality, and the duration of the said slip would be indicated upon the said chart by the pencil. So, also, should an attempt be made to stop the action of the instrument, say for the distance of a mile, by braking the wheels so tight as to cause them to slide, this action would be indicated by a straight line across the chart, and the distance for which the wheel had been slid would be indicated by the space at the end of the chart over which the pencil had not drawn its mark at the end of the trip.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with the drum I and roller S, of mechanism, substantially as herein set forth, whereby the roller may be lifted off and turned aside from the drum, substantially as and for the purpose described.

2. The combination, with the drum I, of the roller S, block S′, stem T, and spiral springs T′, substantially as and for the purpose described.

3. The combination, with the pencil-lever N, of a weight, *n*, substantially as and for the purpose described.

4. The combination, with the yoke M and the pencil-lever N, of the open or slotted bearing *l*, whereby the pencil-lever may be easily removed, substantially as and for the purposes described.

5. In combination with the drum I and its chart, the side-clamps K, substantially as and for the purposes described.

6. The combination, with the side clamps K, of the set-screws K′, substantially as and for the purposes described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WM. W. WYTHE.

Witnesses:

FRANCIS TOUMEY,

H. T. HOWER.