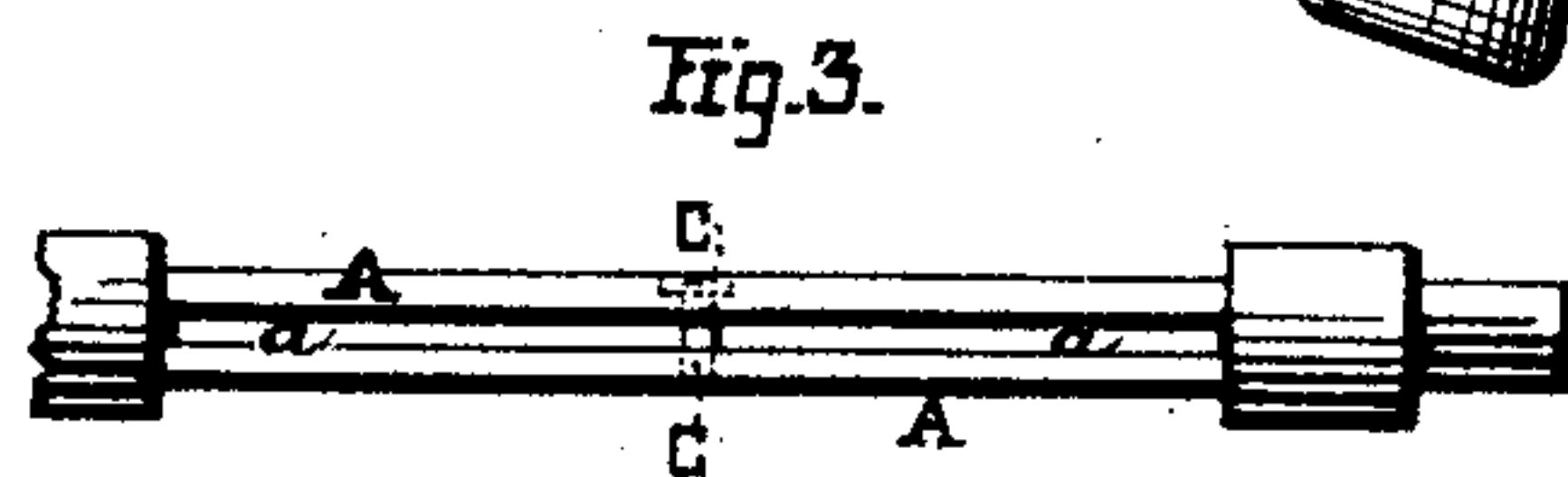
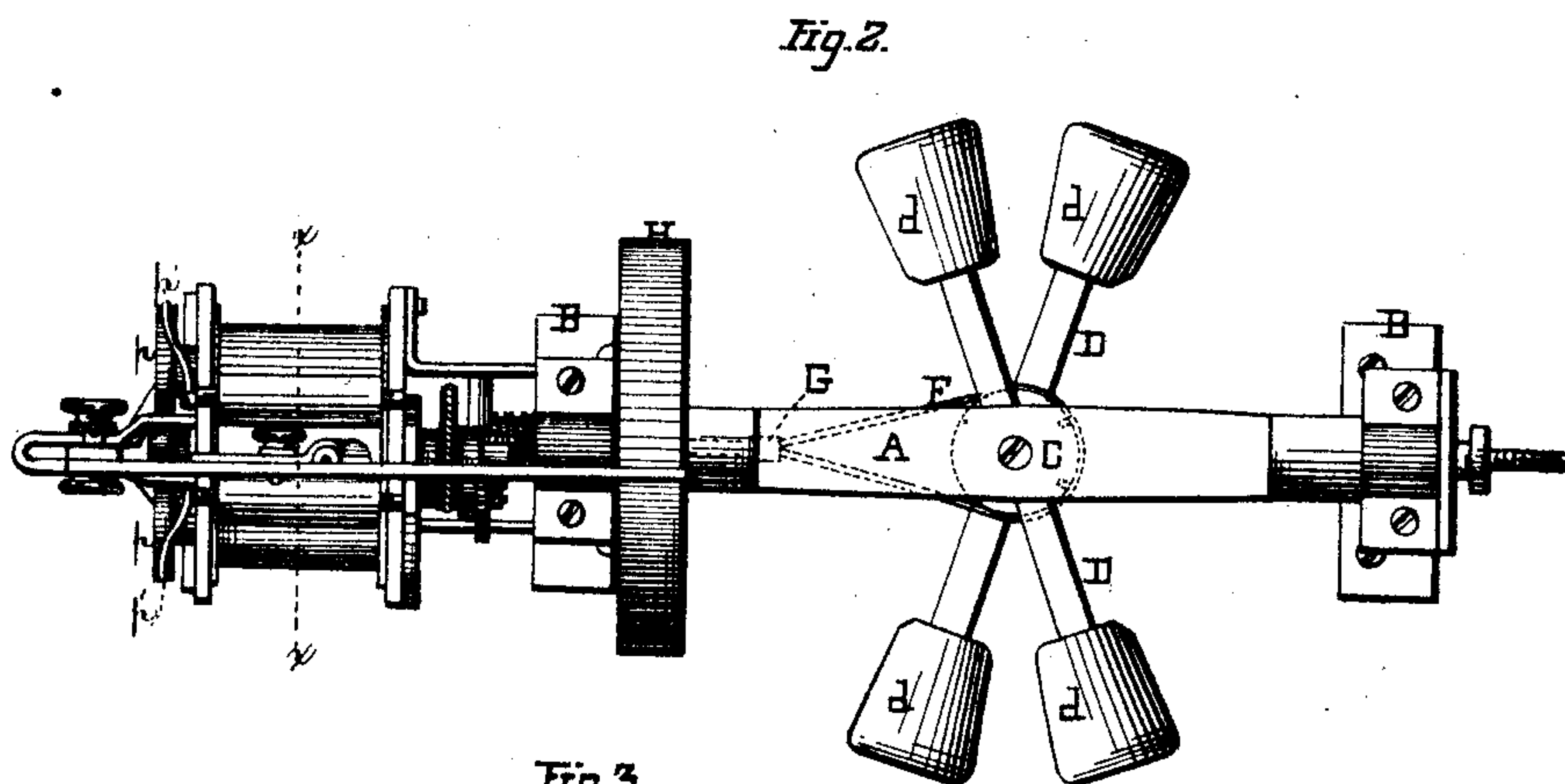
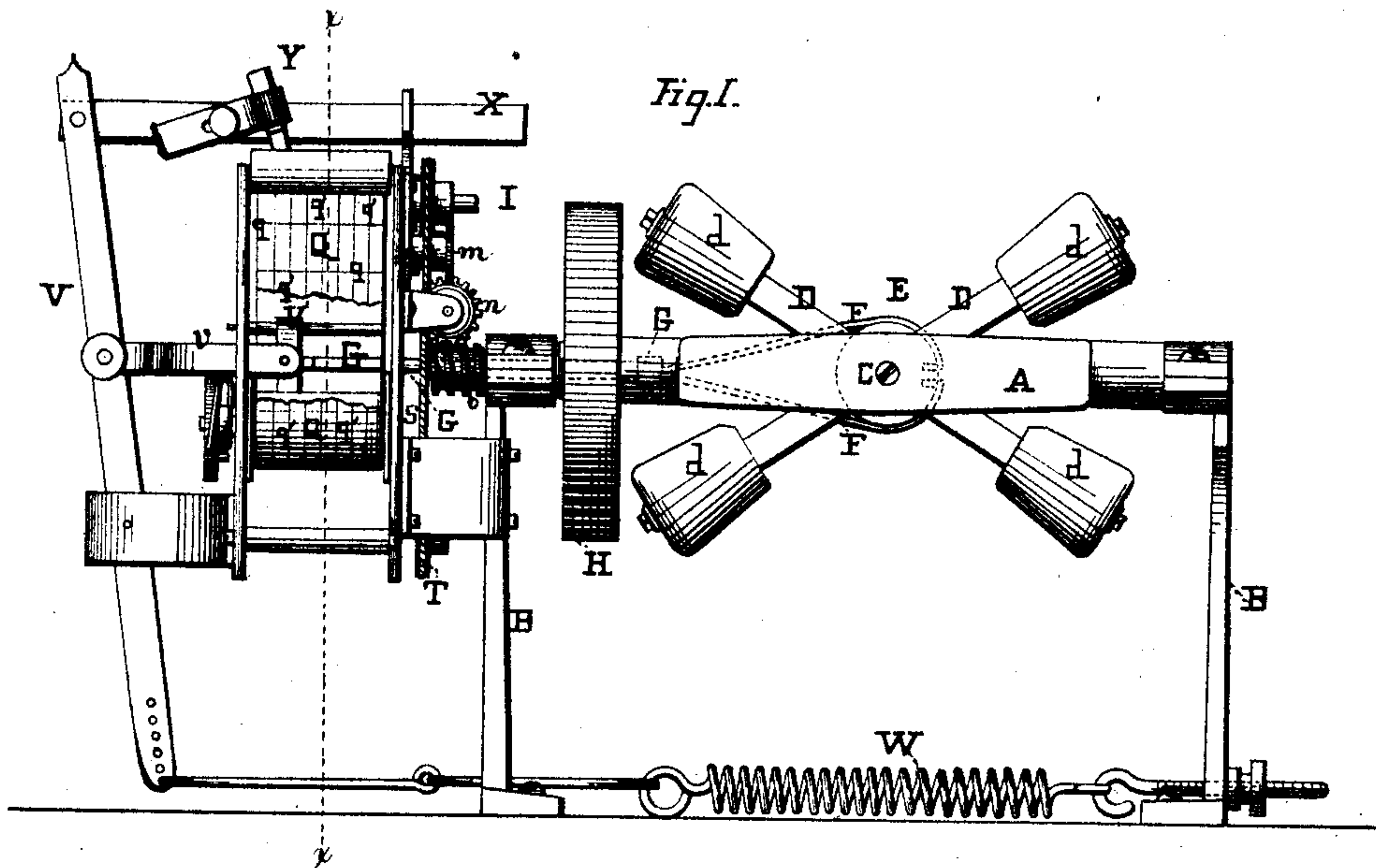


F. M. SPEED & J. N. POAGE.

Apparatus for Recording Speed of Railway-Cars.

No. 150,902.

Patented May 12, 1874.



WITNESSES.

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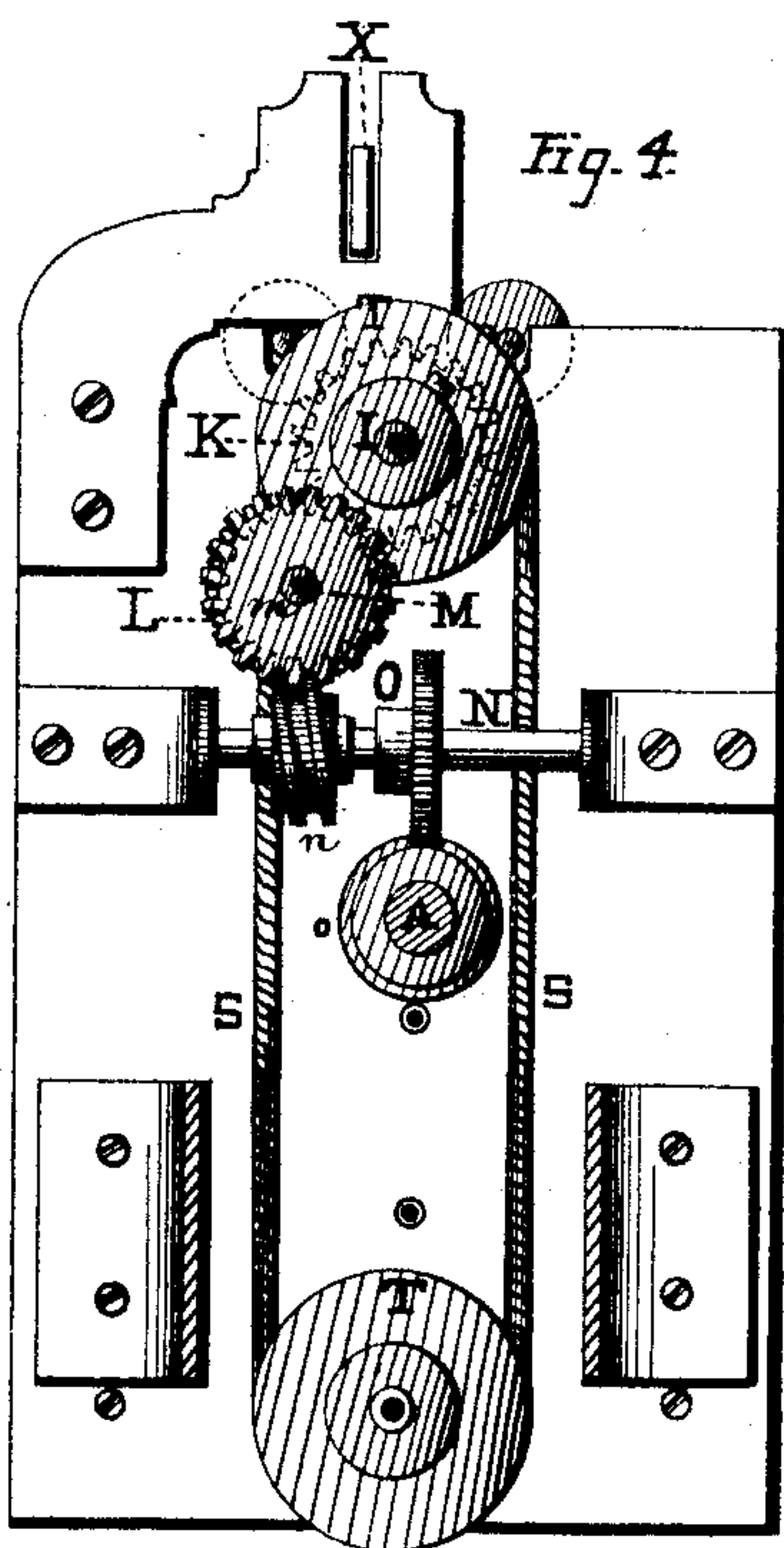


Fig. 4.

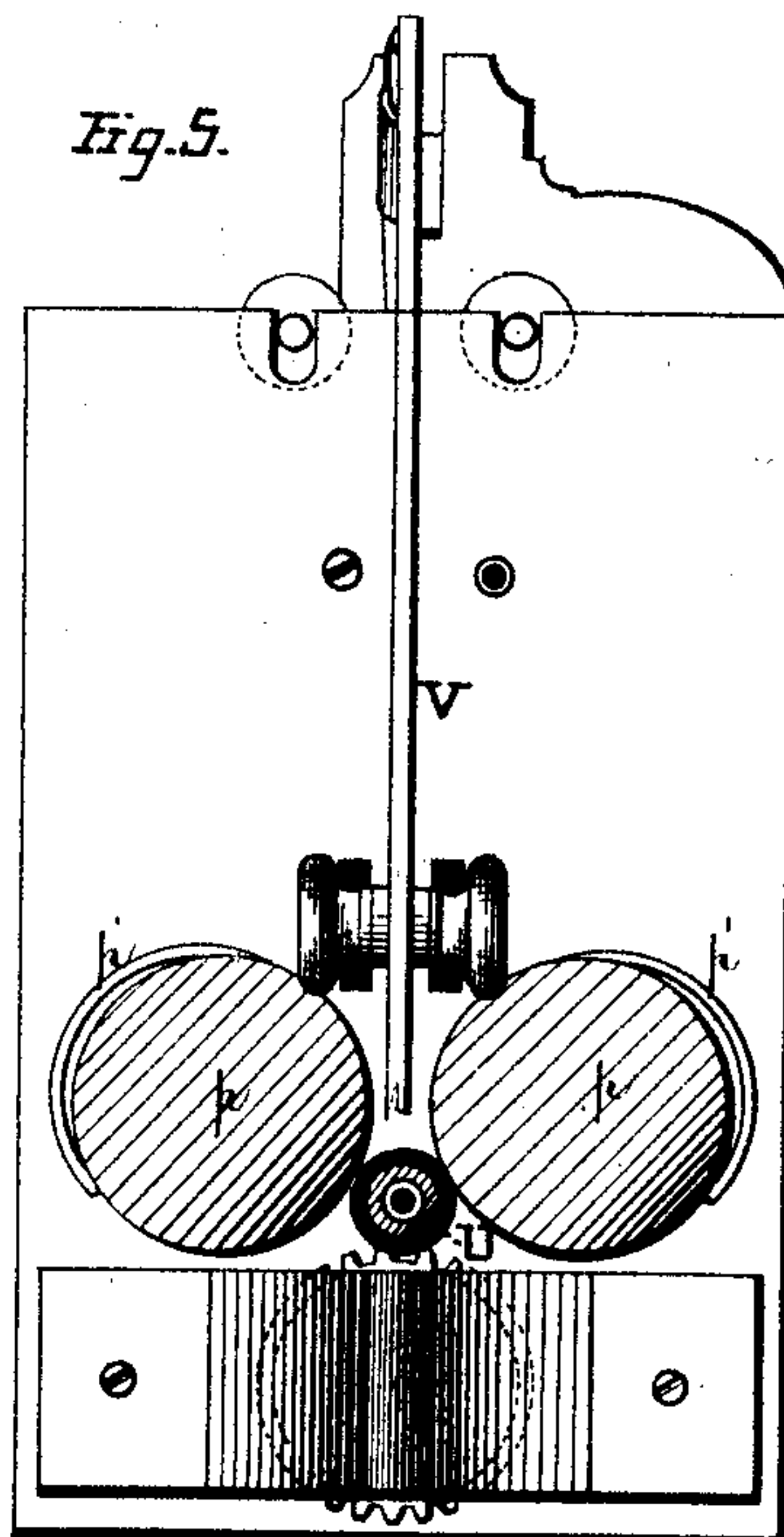


Fig. 5.

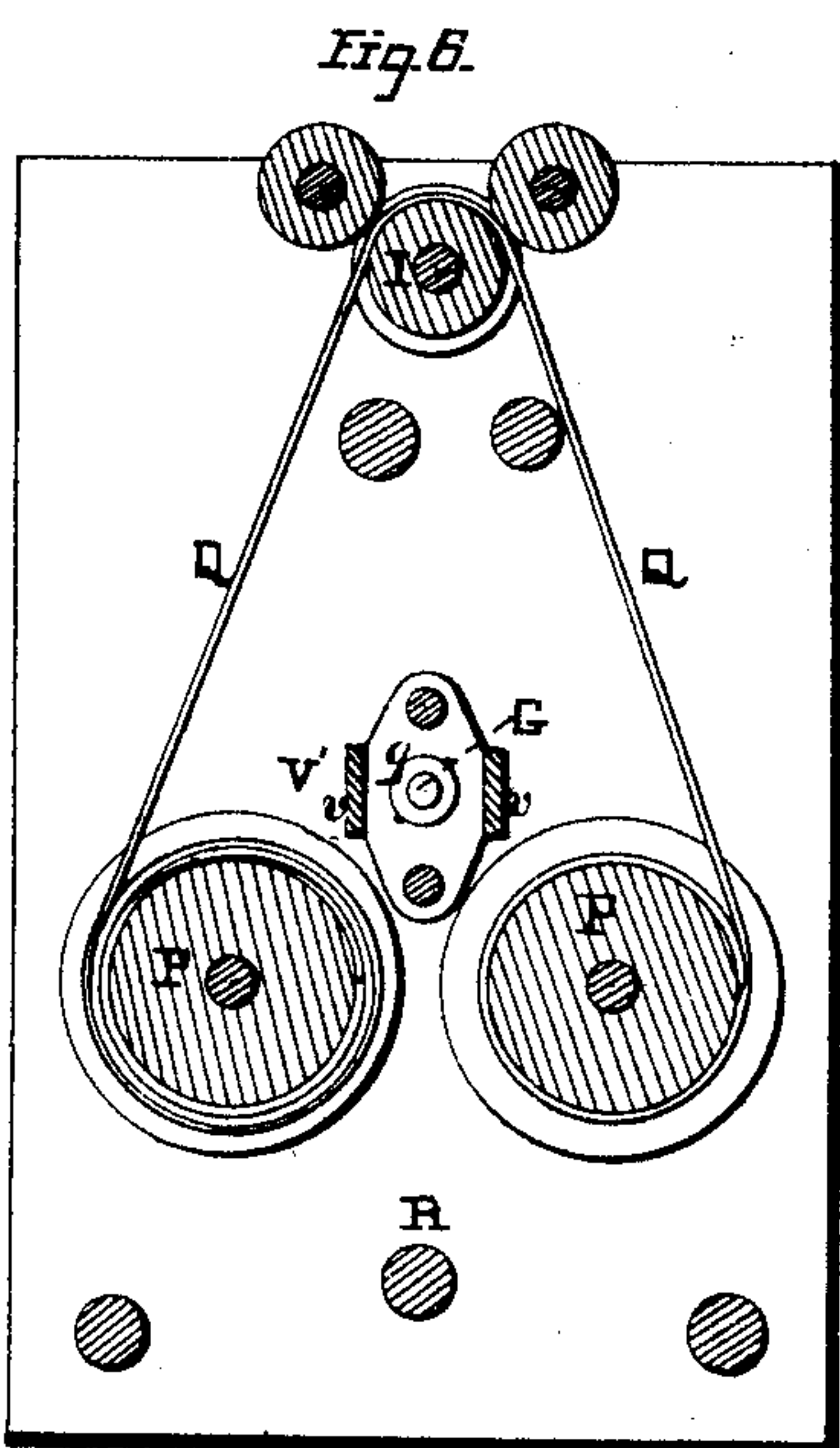


Fig. 6.

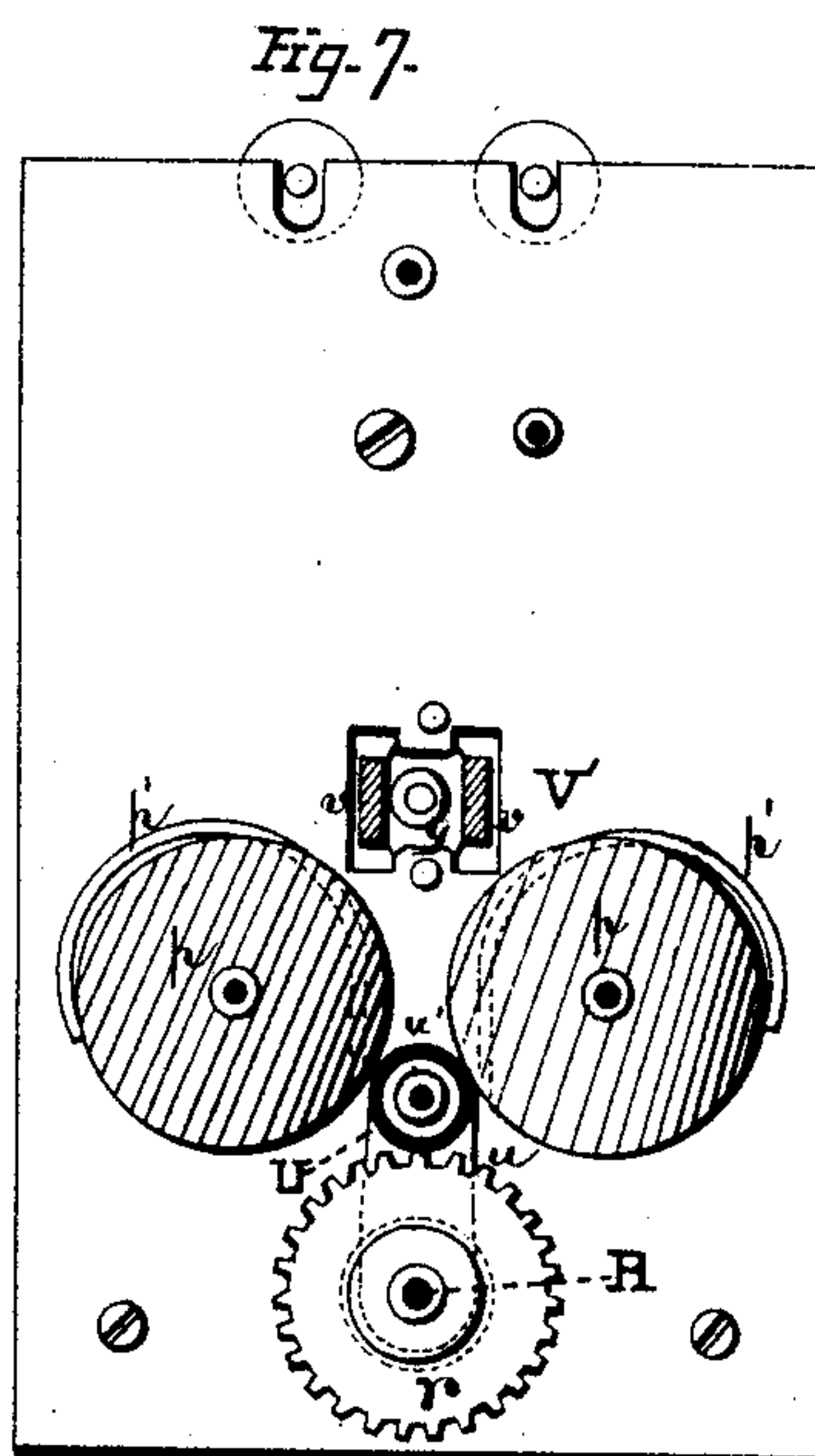


Fig. 7.

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UNITED STATES PATENT OFFICE.

FRANCIS M. SPEED AND JOHN N. POAGE, OF CINCINNATI, OHIO, ASSIGNORS
TO THEMSELVES AND THOMAS H. O'NEAL, OF SAME PLACE.

IMPROVEMENT IN APPARATUS FOR RECORDING SPEED OF RAILWAY-CARS,

Specification forming part of Letters Patent No. **150,902**, dated May 12, 1874; application filed
May 15, 1873.

To all whom it may concern:

Be it known that we, FRANCIS M. SPEED and JOHN N. POAGE, of Cincinnati, in the county of Hamilton and in the State of Ohio, have invented certain new and useful Improvements in Apparatus for Recording Speed of Railway-Cars; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a side elevation of our improved apparatus. Fig. 2 is a plan view of the upper side of the same. Fig. 3 is an edge view of the operating-shaft and weighted levers. Figs. 4 and 5 are elevations of opposite sides of the recording mechanism. Fig. 6 is a vertical section of the latter upon line *xx* of Figs. 1 and 2, and Fig. 7 is an elevation of the outer side of said recording mechanism with the recording-lever removed.

Letters of like name and kind refer to like parts in each of the figures.

The object of our invention is to record the speed of railway-trains at each portion of their run; and it consists, principally, in the construction and combination of the operating-shaft, weighted levers, and operating-rod, substantially as and for the purpose hereinafter specified. It consists, further, in the recording apparatus, when constructed to operate substantially as and for the purpose hereinafter shown. It consists, further, in the means employed for moving the record-blank beneath the marking-point, substantially as and for the purpose hereinafter set forth.

In the annexed drawings, A represents a shaft, journaled within suitable bearings B, and provided within its enlarged central portion with a longitudinal central slot, *a*, through the longitudinal center of which slot extends a pin, C, as shown in Fig. 2. Upon the pin C, and within the slot *a*, are pivoted two bars, D, which have a length somewhat greater than the length of said slot, and are provided upon their ends with enlargements *d*. Attached to the inner face and at the center of each bar D is a pulley, E, to the periphery of

which is attached a flat spring, F, that extends inward to one end of the slot *a*, and is connected to or with one end of a rod, G, which from thence extends outward through a corresponding longitudinal opening formed in the center of the shaft A. The corresponding ends of the weighted bars D are placed upon opposite sides of the shaft A, and the springs F are attached to opposite outer sides of the pulleys E, so that if said bars are caused to turn upon their axial bearing C, said springs will be simultaneously wound upon, or unwound from, their pulleys, so as to correspondingly draw the rod G into, or permit it to be withdrawn from, said shaft. Upon the inner end of the shaft A is affixed a pulley, H, which is connected to or with a pulley attached to one of the car-axles by means of a suitable elastic belt, so that, as the car is moved in either direction, the motion of its axle is communicated to said shaft A. The rod G is drawn outward, by means of mechanism hereinafter described, so as to cause the weighted bars to occupy the position shown in Fig. 1 when the shaft A is at rest; while, when said shaft is revolved, the centrifugal force operates to move the weighted ends *d* of said levers away from said shaft, until, at the highest rate of speed, said bars D occupy the position shown in Fig. 2, and have a line at right angle to that of said shaft. Suitably journaled within bearings in a line with, but above and just outside of, one end of the shaft A is a roller, I, to one end of which is secured a gear-wheel, K, that meshes with, and receives motion from, a second gear-wheel, L, which is secured to or upon a shaft, M, placed in a line with and below said roller I. A second shaft, N, is suitably journaled directly above the end of the shaft A, and in a line having a right angle to the same, and is provided upon its periphery with a worm, *n*, which meshes with, and imparts motion to, a worm-gear, *m*, attached to or upon the shaft M. A worm-gear, O, attached to or upon the shaft N, and meshing with a worm, *o*, attached to the end of the shaft A, serves to connect with the latter said mechanism, so as to cause said

parts to revolve simultaneously. At some distance below the roller I are journaled two rollers or spools, P, around which are wound opposite ends of a paper strip or ribbon, Q, which ribbon passes from one spool to the other around or over said roller I. Directly below the spools P, which are separated as shown, is placed a shaft, R, which is connected with the roller I by means of a cord, S, that passes around pulleys T attached to the ends of the same. Upon the outer end of the shaft R is pivoted a bar, *u*, which extends upward, and, at a point about in a line with the lower sides of the spools P is provided with a stud, *u'*, that extends horizontally outward, and furnishes a bearing for a roller, U, to or upon the rear side of which is secured a pinion, *u''*, that meshes with and receives motion from a gear-wheel, *r*, attached to the end of said shaft R. Upon the projecting end of each spool-shaft is placed a pulley, *p*, which has such dimensions as to cause its periphery to nearly touch the periphery of the roller U, when the latter is directly over the center of the shaft R. As thus arranged, it will be seen that, by turning the upper end of the pivoted bar *u* in either direction, the roller U will be brought into contact with one of the pulleys *p*, and by friction impart to the latter and to its spool any motion that may be communicated to it through its pinion, the gear-wheel *r* and the shaft R. In order that the friction-roller U may be automatically moved from contact with one pulley to the other, as the motion of the mechanism is reversed, a rubber gasket is placed between the gear-wheel *r* and the pivoted bar *u*, and furnishes a friction-clutch which turns said bar in the direction in which the shaft R is moving, and also causes said friction-roller to be held against the contiguous pulley with sufficient force to insure the motion of the latter. As thus arranged, it will be seen that the direct motion of the roller I will cause the paper ribbon to be unwound from one of the spools, while by means of the shaft R and roller U the opposite spool will be rotated, so as to cause said ribbon to be wound thereon as it passes from said shaft I; and, further, that as the motion of the latter shaft is changed, the driving-roller U will automatically move to and rotate the opposite spool. A spring, *p'*, attached at one end to the frame, and having its opposite free end resting upon the periphery of each spool *p*, forms a friction-clutch, which prevents said spool from being accidentally turned. Extending vertically from above the roller I to a point below the roller R is a lever, V, which is suitably pivoted below its longitudinal center, so as to be capable of motion in a vertical plane and in a line with the shaft A. The outer end of the rod G passes through and is swiveled within a head, V', which works in suitable guides attached to the frame, and by means of two side bars, *v*, is connected with the lever V above its pivotal bearing, a collar, *g*, upon the outer end of said rod G

preventing the withdrawal of the same, while said head is held outward against said collar by means of a spring, W, that operates upon the lower end of said lever, as shown in Fig. 1. To the upper end of the lever V is attached an arm, X, which extends horizontally over the transverse center of the roller I, and is provided with a pointer, Y, that bears upon the surface of the paper ribbon Q, and, when the latter is moved beneath the same, makes a mark thereon. The ribbon Q is provided with suitable cross-lines *q*, which are placed at such distances apart, and the speed of the roller I so adjusted as to cause the distance from one line to another to represent one mile, or any fraction thereof, of travel for the car. A series of longitudinal lines, *q'*, upon said paper are appropriately numbered, and are intended to indicate the speed of the car from its lowest to its highest rate.

The apparatus is now complete, and operates as follows: As the car moves in either direction, the revolution of the main shaft will cause the weighted ends of the levers to move outward in a greater or lesser degree, and, through the mechanism shown, correspondingly move the pointer across the moving strip of paper, the relative lateral position of said pointer upon said ribbon (as recorded by the mark left by its point) indicating the speed of the car, while the longitudinal movement of said ribbon indicates the space passed over by said car.

This arrangement furnishes a complete record of the speed of trains, and enables any violation of regulations governing the same to be at once detected.

Having thus fully set forth the nature and merits of our invention, what we claim as new is—

1. The shaft A, weighted pivoted levers D and *d*, pulleys E, springs F, and operating rod G, when constructed and combined to operate substantially as and for the purpose specified.

2. In combination with the shaft A, weighted levers D and *d*, pulleys E, springs F, and operating rod G, the pivoted lever V provided with the springs W, arm X, and pointer or marker Y, substantially as and for the purpose shown.

3. In combination with the rollers I, P, and P, disks *p* *p''*, and record-blank Q, the shaft R provided with the pulley T, and connected with said roller I by means of the cord S, the pivoted bar *u*, the roller U, the pinion *u''*, and the gear-wheel *r*, substantially as and for the purpose shown and described.

In testimony that we claim the foregoing we have hereunto set our hands this 12th day of May, 1873.

FRANCIS M. SPEED.
JOHN N. POAGE.

Witnesses:

GANO WRIGHT,
J. W. BREWSTER.