

No. 824,536.

PATENTED JUNE 26, 1906.

T. ELLIS & G. H. PURVIS.
AUTOMATIC TRACK INSPECTOR.

APPLICATION FILED MAR. 30, 1904.

3 SHEETS—SHEET 1.

Fig 1

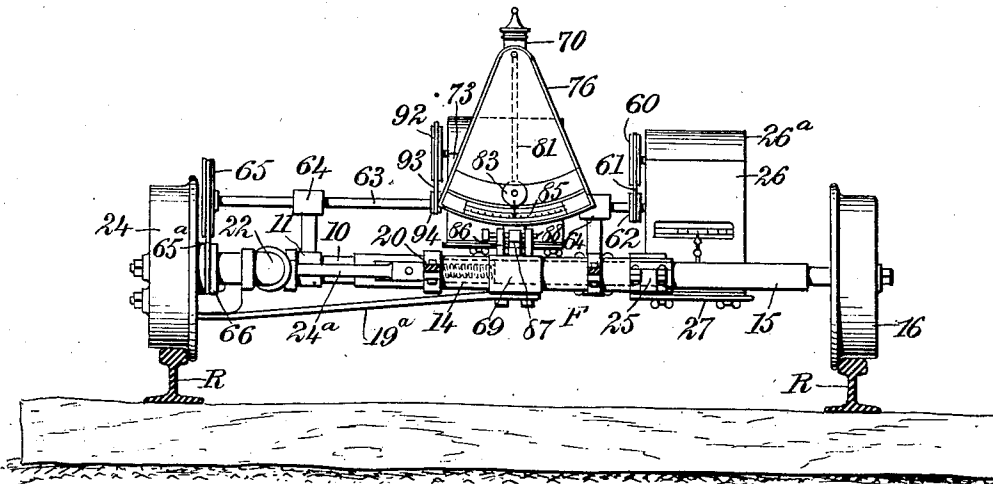
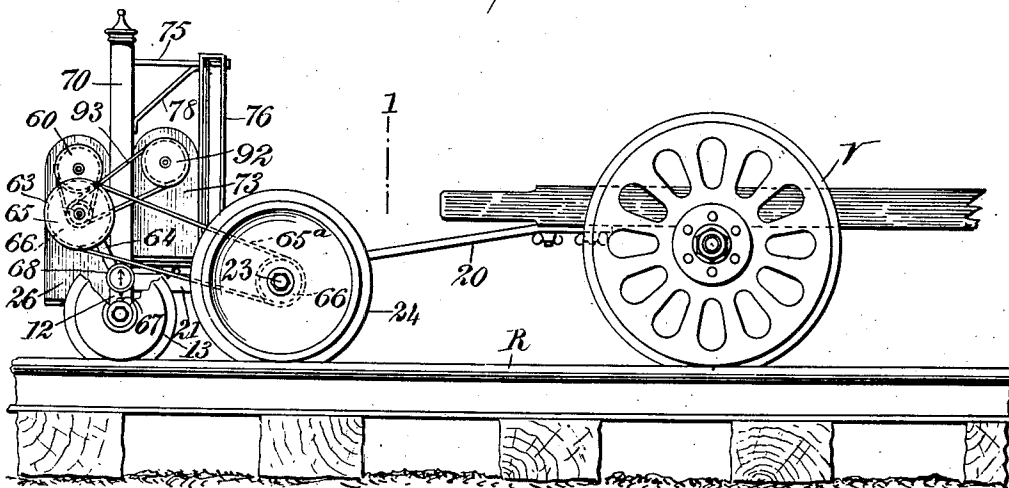


Fig 2



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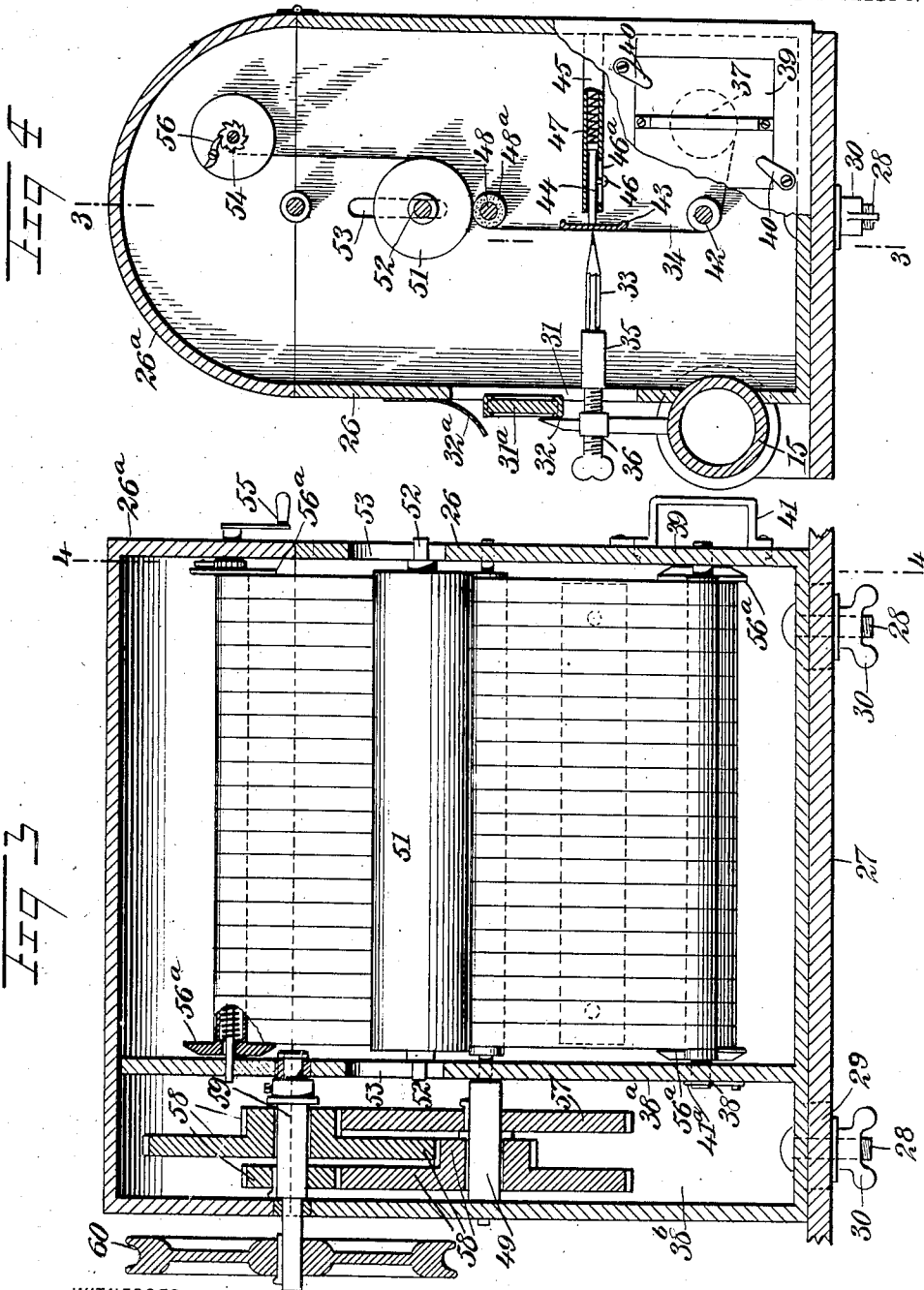
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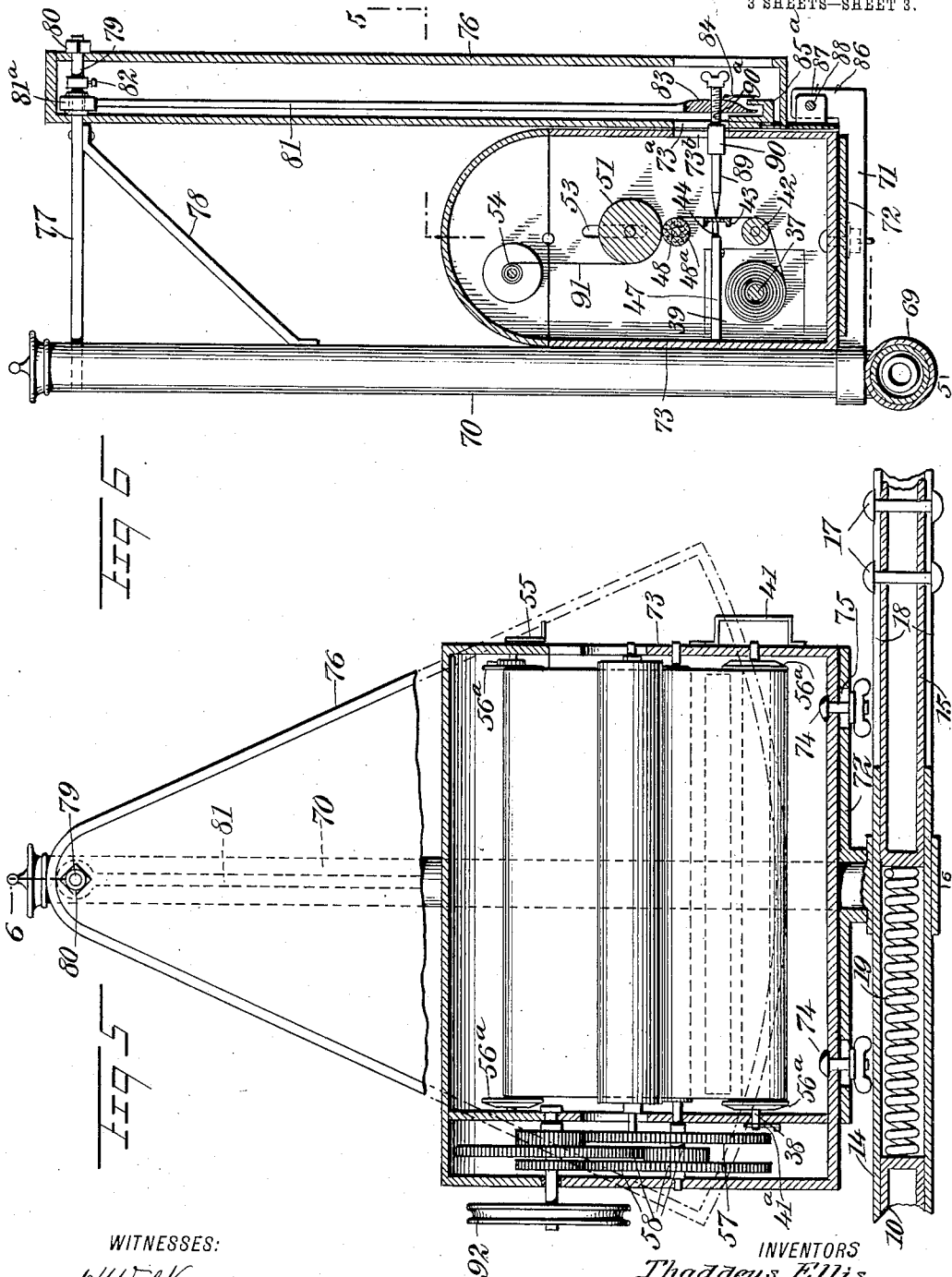
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

THADDEUS ELLIS AND GEORGE HERNDON PURVIS, OF LESTER,
WASHINGTON.

AUTOMATIC TRACK-INSPECTOR.

No. 824,536.

Specification of Letters Patent.

Patented June 26, 1906.

Application filed March 30, 1904. Serial No. 200,719.

To all whom it may concern:

Be it known that we, THADDEUS ELLIS and GEORGE HERNDON PURVIS, citizens of the United States, and residents of Lester, in the county of King and State of Washington, have invented a new and Improved Automatic Track-Inspector, of which the following is a full, clear, and exact description.

Our invention relates to apparatus for examining the condition of the tracks of railways, and more particularly to those for determining the variations in the gage and level thereof.

It has for its objects the provision of a convenient and effective apparatus of this class.

It consists in the various features and combinations hereinafter described, and more particularly claimed.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a transverse section on the line 1 1 of Fig. 2 of one embodiment of our invention. Fig. 2 is a side elevation of the same attached to a car. Fig. 3 is a longitudinal section through the gage-indicating mechanism on the line 3 3 of Fig. 4. Fig. 4 is a transverse section on the line 4 4 of Fig. 3. Fig. 5 is a longitudinal section through the level-indicating mechanism on the line 5 5 of Fig. 6, and Fig. 6 is a transverse section therethrough on the line 6 6 of Fig. 5.

F designates a frame which is formed in two sections, preferably made up of tubular members. One of these sections consists of a horizontal arm 10, at the outer end of which is a T-fitting 11, and at the opposite end of this T is a depending extension 12, carrying the axle for a wheel 13, adapted to rest on one of the lines of rails R. The arm 10 has secured to its inner extremity a sleeve 14, which may be bolted thereto, and into this sleeve projects an arm 15 of the other frame-section, this arm carrying the axle of the wheel 16, which coacts with the other line of rails. The arm 15 is permitted a longitudinal movement in the sleeve, while held against rotation therein or separation by bolts or pins 17, fixed in the arm and extending through opposite slots 18 18, lying longitudinally of the sleeve. To force the two sections from one another and normally maintain the flanges of the wheels in contact with the rails, a spring 19,

preferably of spiral form, is provided within the sleeve, having its ends contacting with the adjacent ends of the section-arms. This allows for a movement of the sections relatively to one another when there is any variation in the gage of the track over which they are passing.

To strengthen the frame, a brace 19^a may be connected to the frame members 12 and 14, and to the sleeve, conveniently by encircling it, may be attached a draft-bar 20, the end of which may be fixed to the hand-car or other track-vehicle V, by which the inspecting apparatus is to be drawn.

From the side opening of the T 11 extends an arm 21, having at its outer end an elbow 22, this elbow carrying an axle member 23, upon which a third wheel 24 is journaled. To strengthen this portion of the structure, a brace 24^a may connect the arm 21 with the sleeve 14.

About the outer or open end of the sleeve is secured a clamp 25, having projecting from beneath it a plate 27, upon which is supported a casing 26, preferably provided with a hinged top 26^a. The casing may be adjustably secured upon the plate by bolts 28, extending through slots 29 in the plate, it being clamped in its adjusted position by thumb-nuts 30, situated on the bolts beneath the plate. Across an opening 31 in the front of the casing is located a scale 31^a, and over this scale moves a pointer 32, which is fixed to the arm 15. The zero of this scale is situated substantially at the center, and the graduations upon each side of this may be made to read in units of track-gage. The relative movement of the frame-sections operating under the contact of the wheel-flanges with the track and under the influence of the spiral spring results in the pointer moving to one side or the other as the gage changes. The pointer may be brought to the normal or zero position when the car is resting upon a portion of track which is of standard gage by the movement of the casing upon the plate. If desired, a hood 32^a may be placed along the upper edge of the casing-opening extending over the scale.

Mounted upon the pointer 32 is shown a stylus or pencil 33, which may coact with a record-receiving member, here shown as a ribbon 34, preferably of paper. The pencil may be conveniently mounted in a socket 35,

which is threaded through the pointer at 36, this arrangement permitting its adjustment toward and from the paper. The record-receiving ribbon passes from a supply-roll 37, which is journaled at 38 in an inner wall 38^a of the casing, which wall forms between it and the end of the casing a chamber 38^b. At the opposite end the roll 37 is journaled in a door or closure 39 of an opening in the casing of sufficient size to permit the admission of a full roll of the ribbon. This door may be secured in place by buttons 40 and is preferably provided with a handle 41 for convenience in removing or applying it. At one end of the roll may be situated a spring-tension device 41^a to prevent too free rotation thereof. From the supply-roll the ribbon passes over a suitable guide-roll 42 and then upward over a platen 43, which is situated on the opposite side of the ribbon from the stylus and serves as an operating or contact surface therefor. This platen may be mounted by means of a spindle 44, operating in a socket 45, projecting from the rear wall of the casing, and held against rotation by a projection 46, extending through a slot 46^a in the socket-wall. Between the adjacent ends of the spindle and socket is a spiral spring 47, which forces the platen with a proper degree of pressure against the ribbon. From the platen the ribbon operates over a driving-roll 48, which is preferably provided with an outer layer 48^a of rubber or similar yieldable material, this roll being journaled at one end in the outer casing-wall and having the other end extending through the inner wall 38^a and journaled in the outer wall, there being an intermediate shaft 49 within the chamber.

Above the driving-roll is a tension-roll 51, the opposite journals 52 of which move in vertical slots 53 in the outer and inner casing-walls, allowing the roll to rest yieldably upon the ribbon. From beneath this tension-roll the ribbon rises to a receiving-roll 54, which is shown as journaled in the cover of the casing. This roll 54 is preferably of the spring or curtain-roll type to enable it to exert a tension upon the ribbon to take up the slack from the driving-roll. It is preferably provided with a crank 55, by which it may be rotated to secure the necessary tension, and with a pawl and ratchet 56 to hold this tension when it has been secured until the ribbon has been properly attached. Both the supply and receiving rolls may have at their ends cheeks or retaining-flanges 56^a.

On the shaft 49 is a gear 57, which meshes with a suitable train of slow-down gearing 58, connecting with a shaft 59, journaled in the casing-wall 38^a and in the adjacent outer wall. Upon this latter shaft is fixed a pulley 60, which is connected by a belt 61 with a pulley 62 upon a main shaft 63, extending transversely of the frame and journaled in brackets 64, secured to the sleeve and fixed

arm. Upon the opposite end of this shaft 63 is a pulley 65, which is connected by a belt 65^a with a pulley-surface 66, carried by the hub of the wheel 24. The diameter of this track-wheel being known, it is only necessary to have a determinate ratio of gearing connecting it with the mechanism for advancing the record-receiving member to have this latter moved at a definite rate, so that a longitudinal scale of distances may be inscribed thereon. Then when beginning the inspection if this ribbon is started at the zero-point in its movement from the roll the departure of the mark made by the stylus from the zero or standard gage may be referred to the exact place upon the line at which it occurs. The wheel 13 may also be of definite diameter and is shown as carrying a projection 67, which actuates a cyclometer or like instrument 68, carried upon the frame and enabling the distance traveled to be read by the operator at any time without reference to the ribbon within its casing.

About the sleeve 14, situated substantially at the center of the frame, is a clamp or collar 69, carrying a standard 70. Secured near the foot of this standard is a pair of arms 71 71, carrying a plate 72, furnishing a support for a casing 73, which may be generally similar to that previously described. The casing may be adjustably secured on the plate by bolts 74, having suitable finger-nuts passing through longitudinal slots 75 in the plate. At one side of the casing 73, having an opening 73^a, registering with an opening 73^b therein, is secured a sector-shaped casing 76, through the upper extremity of which projects an arm 77, carried by the standard and preferably braced by a diagonal member 78. This arm 77 has within the sector-shaped casing a cylindrical portion 79, which projects through the front of said casing and is threaded at its outer end to receive a retaining-nut 80. Within the casing 76 upon this cylindrical portion oscillates a pendulum or level-indicating member 81, one side of the supporting-boss 81^a of which contacts with the inner casing-wall and the other with a collar 82, which may be clamped upon the arm. At the lower end of the pendulum is a weight or bob 83, and from this projects a pointer 84, operating over a segmental scale 85, situated at the bottom of the casing 76. The zero of this scale is located at its center, and the movement of the pointer to one side or the other indicates by suitable graduations thereon the elevation of either rail of the track. The pendulum may be retained in its normal plane of oscillation by a guide-bracket 85^a, which is here shown as furnishing the surface upon which the scale is mounted.

The arms 71 are shown as provided with upturned ends 86, and between these is a lug 87, carried by the front of the casing.

Through the arm ends and the lug is threaded a screw 88, and by rotating this, the nuts of the bolts 74 first having been loosened, the casing may be adjusted on the frame to bring its zero into coincidence with the pointer when the apparatus is upon a true or level track.

The pendulum carries a stylus or pencil 89, which may be mounted in a socket 90, threaded through the weight at 90^a for adjusting the pencil with reference to a ribbon or record-receiving member 91. This ribbon is supported and moved by elements similar to those previously described in connection with the gage mechanism, and they have therefore been designated by the same reference characters. Its gearing is driven by a pulley 92, from which a belt 93 passes over a pulley 94 upon the shaft 63. This effects the advance of the ribbon at a definite rate, as in the companion mechanism, and then when the car is upon a track which departs from the horizontal the amount of variation will be indicated by the swing of the pendulum both upon the scale and by the mark upon the ribbon.

In the use of our improved apparatus each casing is supplied with a suitable roll of paper applied through the removable closures in the openings. The end of each roll is drawn over the guide-roll and platen, over the driving-roll, under the tension-roll, and onto the supply-roll, to which it is secured, this roll having previously been given sufficient tension to take up the slack. The frame may now be placed upon a track which is standard for the gage upon which it is desired to operate and which is also perfectly level and both the gage and level indicating mechanism adjusted by the movement of their casings until the pointers upon the arm and pendulum coincide with the zero or standard graduations upon the scale. It will be evident that this may be readily effected for each mechanism without disturbing the other by virtue of the entire independence of the casings and adjusting elements. The apparatus is now attached by its connecting-bar to the car which is to draw it and upon being moved over the track will give to the observer by the position of the pointers upon the scales exact readings of both the gage and level. At the same time the contact of the styli with their ribbons will furnish a permanent record of the movements of the indicating mechanism or profiles of the elevation and gage. This will enable the two records to be laid side by side and very perfect comparisons made.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

1. In a track-inspector, the combination with a frame adapted to operate upon the rails,

of two casings mounted thereon, gage-indicating and level-indicating mechanism carried by the frame, record mechanism associated with each indicating mechanism and being separately situated within the casings, and independent means for adjusting each casing upon the frame.

2. The combination with a wheeled frame adapted to operate upon a track, of means for indicating the level and gage of the track, such means comprising wheel-carrying axle-arms, a sleeve connecting adjacent ends of said arms, one of said arms being laterally movable in the sleeve, measuring means for indicating the amount of movement of the arm in the sleeve, measuring means for indicating the level of the track, independent means for producing a record of the movement of each measuring means, each of said means being separately movable upon the frame, and means for independently fixing the position of the record-producing means.

3. In a track-inspector, the combination with a sectional wheeled frame, a sleeve connecting adjacent end portions of the sections, said sections having lateral movement relative to each other, a spring situated in the sleeve and bearing against the sections to force them relatively outward, a support carried by said sleeve, a standard mounted upon the support, measuring means for indicating the level of the track carried by the said standard, gage-measuring means carried by the sleeve and one of the frame-sections, independent means for producing a record of the movement of the measuring means, each of said means being separately movable upon the frame, and means for independently fixing the position of the record-producing means.

4. In a track-inspector, the combination with a frame adapted to operate upon the rails, of gage-indicating mechanism, level-indicating mechanism, a stylus operated by each of said mechanisms, independent members adapted to support record-receiving members with which the styli may separately coact, and means for varying the position of each of the indicating mechanisms upon the frame whereby their normal readings may be independently adjusted.

5. The combination with an indicating member carrying a stylus, of a roll adapted to supply a ribbon with which the stylus may coact, a receiving-roll for said ribbon, a driving-roll with which the ribbon may contact, a platen having a stem and against which the ribbon may be pressed by the stylus, a socket in which the platen-stem operates, and a spring exerting its force upon the platen.

6. The combination with an indicating member carrying a stylus, of a roll adapted to supply a ribbon with which the stylus may coact, a receiving-roll for said ribbon, a

4
 platen having a stem and against which the ribbon may be pressed by the stylus, a socket in which the platen-stem operates, and a spring situated within the socket and acting upon the stem.

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 7. In a track-inspector, the combination with a frame adapted to operate upon the rails, of gage-indicating mechanism, level-indicating mechanism, a stylus operable by each
 10 of said mechanisms, and means for varying the position of each of the indicating mechanisms upon the frame whereby their normal readings may be independently adjusted.

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 8. In a track-inspector, the combination with a frame adapted to operate upon the rails, of gage-indicating mechanism, level-indicating mechanism, a stylus operable by each of said mechanisms, a roll situated adjacent to each stylus, a wheel rotatable by
 20 contact with the rails, and gearing connecting each roll with said wheel.

9. In a track-inspector, the combination with a frame adapted to operate upon the rails, of gage-indicating mechanism, level-indicating mechanism, a stylus operable by
 25 each of said mechanisms, an independently-movable roll situated adjacent to each stylus, a wheel rotatable by contact with the rails, a shaft journaled in the frame and rotatable by
 30 said wheel, and gearing connecting each roll with the shaft.

10. The combination with an indicating member carrying a stylus, of a supply-roll, a receiving-roll, a driving-roll, a platen having
 35 a stem, a socket in which the platen-stem operates, and a spring exerting its force upon the platen.

11. The combination with an indicating member carrying a stylus, of a supply-roll, a
 40 receiving-roll, a platen having a stem, a socket in which the platen-stem operates, and a

spring situated within the socket and acting upon the stem.

12. In a track-inspector, the combination with a frame adapted to operate upon the
 45 rails, of track-indicating mechanism movable by the frame, a stylus carried by the indicating member, a roll adapted to receive a supply-ribbon with which the stylus may coact, a receiving-roll for said ribbon, and a yield-
 50 able driving-roll with which the ribbon may contact.

13. In a track-inspector, the combination with a frame adapted to operate upon the rails, of track-indicating mechanism movable
 55 by the frame, a stylus carried by the indicating member, a roll adapted to receive a supply-ribbon with which the stylus may coact, a receiving-roll for said ribbon, a driving-roll with which the ribbon may contact, a platen
 60 having a stem and against which the ribbon may be pressed by the stylus, a socket in which the platen-stem operates, and a spring exerting its force upon the platen.

14. In a track-inspector, the combination
 65 with a frame adapted to operate upon the rails, of track-indicating mechanism, a stylus carried by the indicating mechanism, means for supplying a ribbon with which the stylus may coact, a casing for inclosing the stylus
 70 and ribbon-supplying means, said casing being provided with an opening, and a closure for the opening having a bearing in which the ribbon-supplying means is journaled.

In testimony whereof we have signed our
 75 names to this specification in the presence of two subscribing witnesses.

THADDEUS ELLIS.

GEORGE HERNDON PURVIS.

Witnesses:

C. A. HERMANN,

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