

T. ELLIS, G. H. PURVIS & J. S. CREECH.

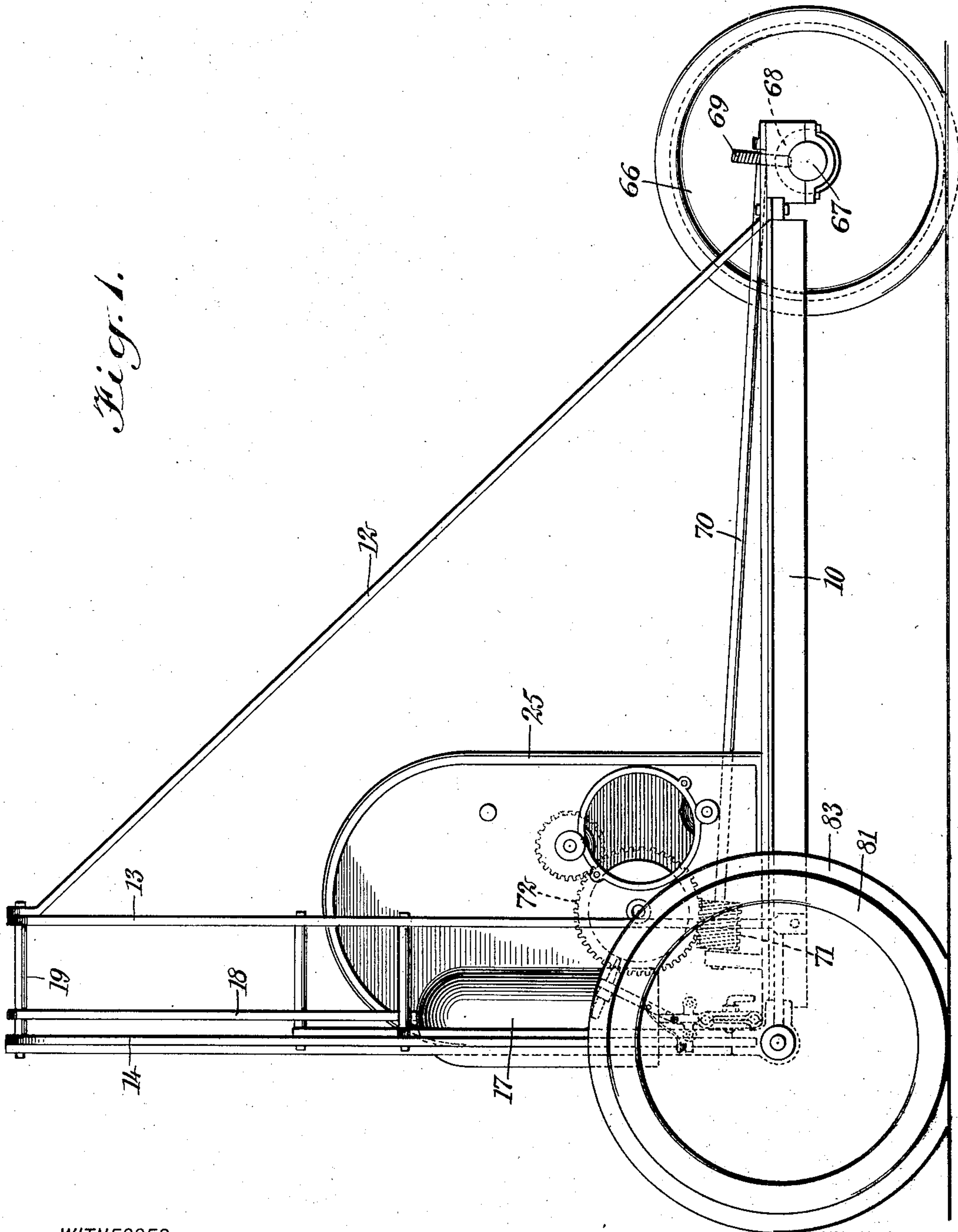
AUTOMATIC TRACK INSPECTOR.

APPLICATION FILED JAN. 5, 1909.

938,993.

Patented Nov. 2, 1909.

5 SHEETS--SHEET 1.



WITNESSES

Geo. W. Mayles
Walton Harrison

INVENTORS
Thaddeus Ellis
George H. Purvis
John S. Creech
BY *Mumma & Co*
ATTORNEYS

T. ELLIS, G. H. PURVIS & J. S. CREECH.

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5 SHEETS—SHEET 2.

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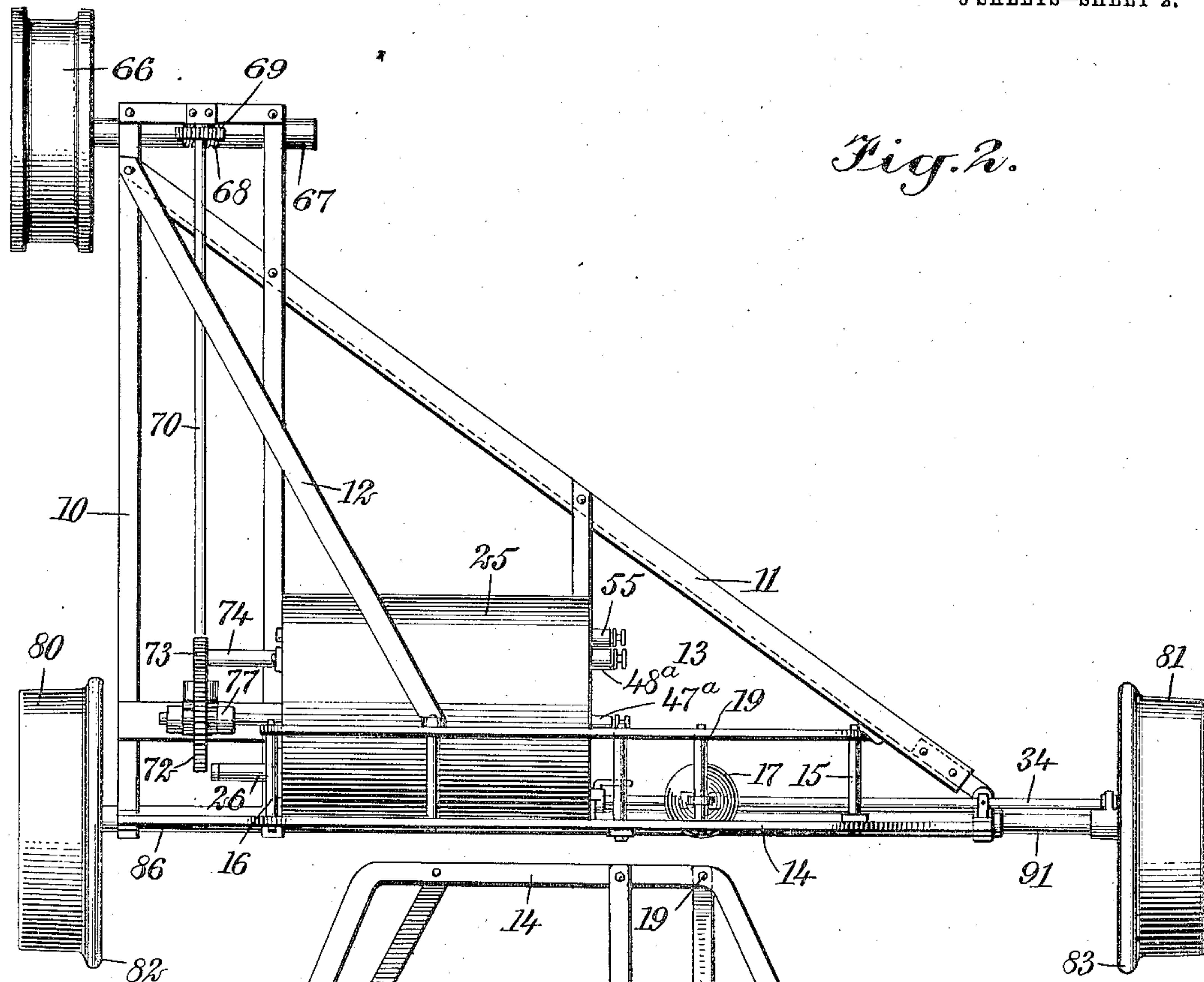


Fig. 2.

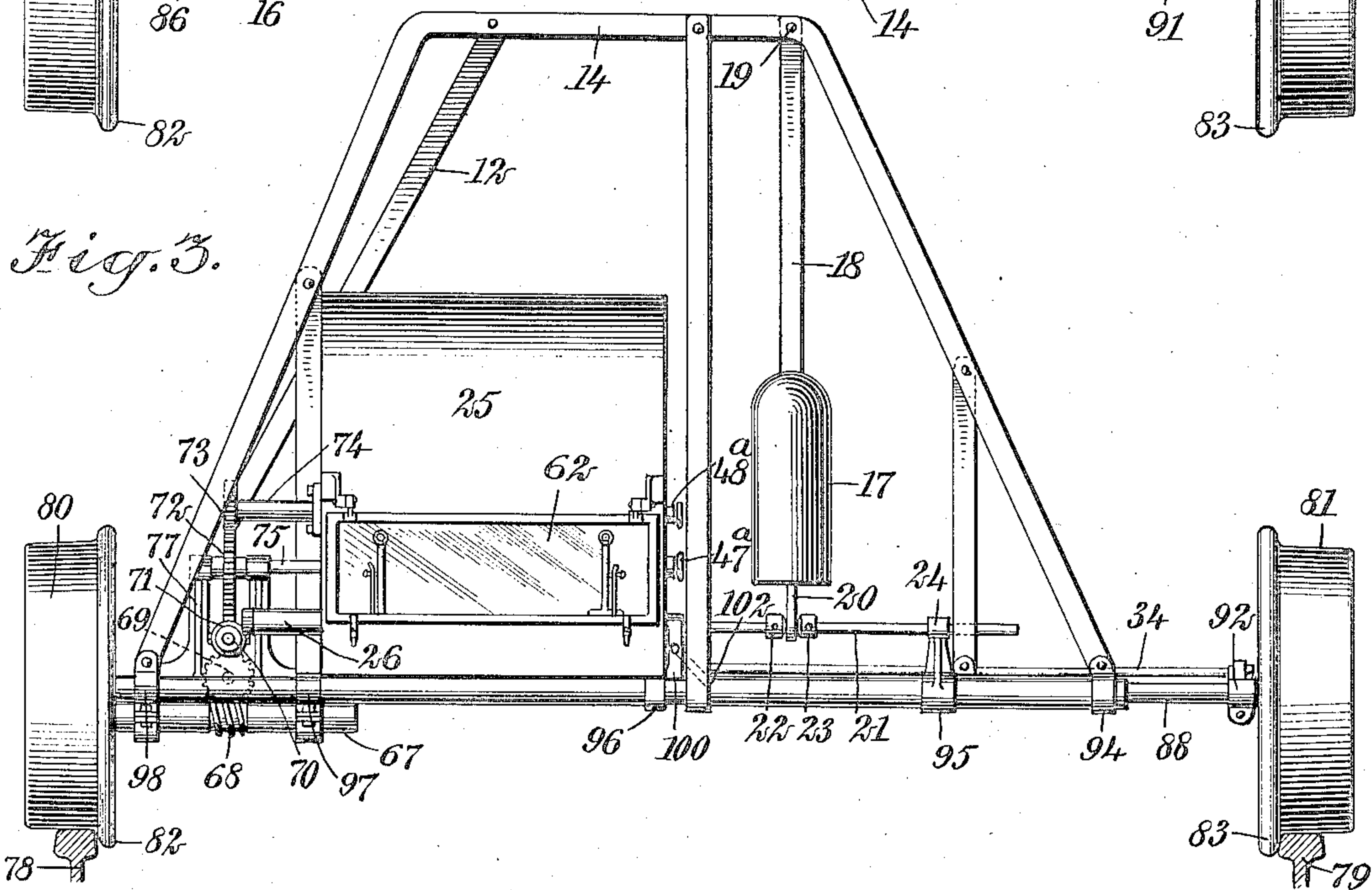


Fig. 3.

WITNESSES

Geo. W. Naylor
Walton Harrison

INVENTORS
Thaddeus Ellis
George H. Purvis
John S. Creech
BY *Mumma & Co.*
ATTORNEYS

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5 SHEETS—SHEET 3.

Fig. 5.

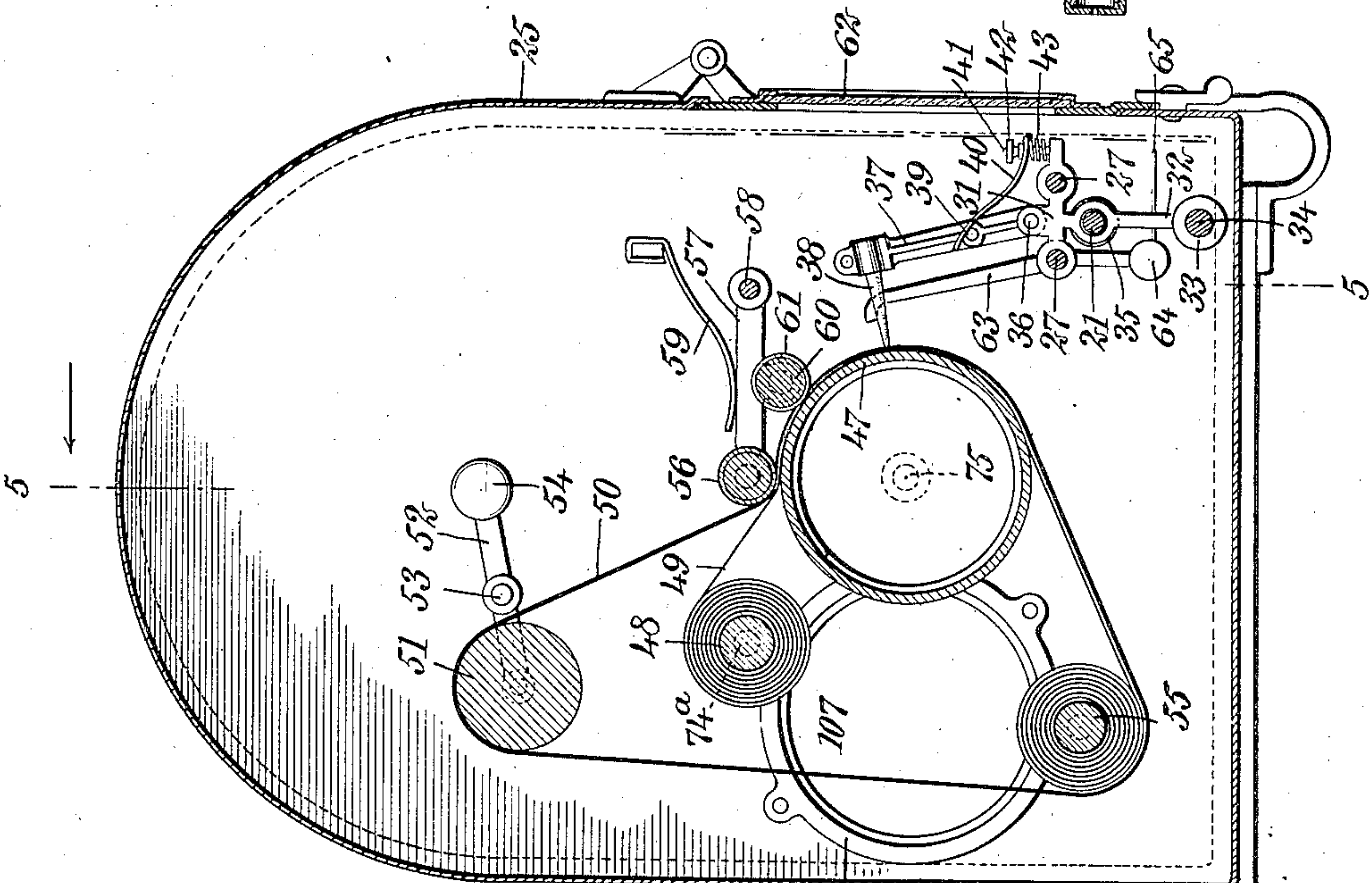
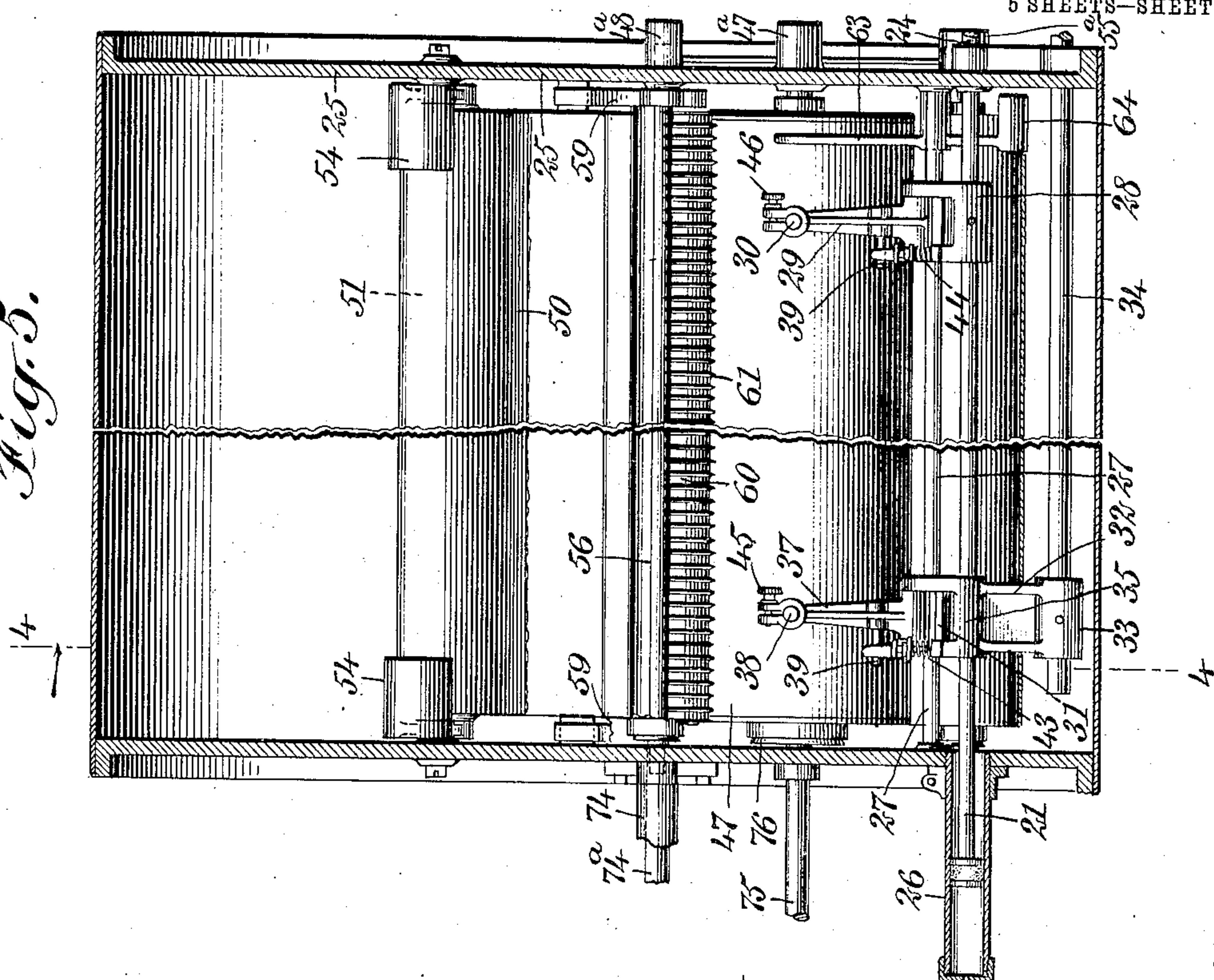


Fig. 4.

WITNESSES

Geo. W. May
Walton Harrison

INVENTORS

Thaddeus Ellis
George H. Purvis
John S. Creech

BY *Mum & Co.*
ATTORNEYS

T. ELLIS, G. H. PURVIS & J. S. CREECH.

AUTOMATIC TRACK INSPECTOR.

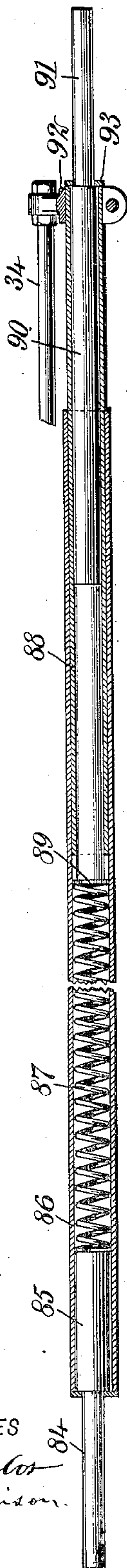
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Fig. 6.



WITNESSES
Geo. W. Maylor
Walton Harrison

Fig. 7.

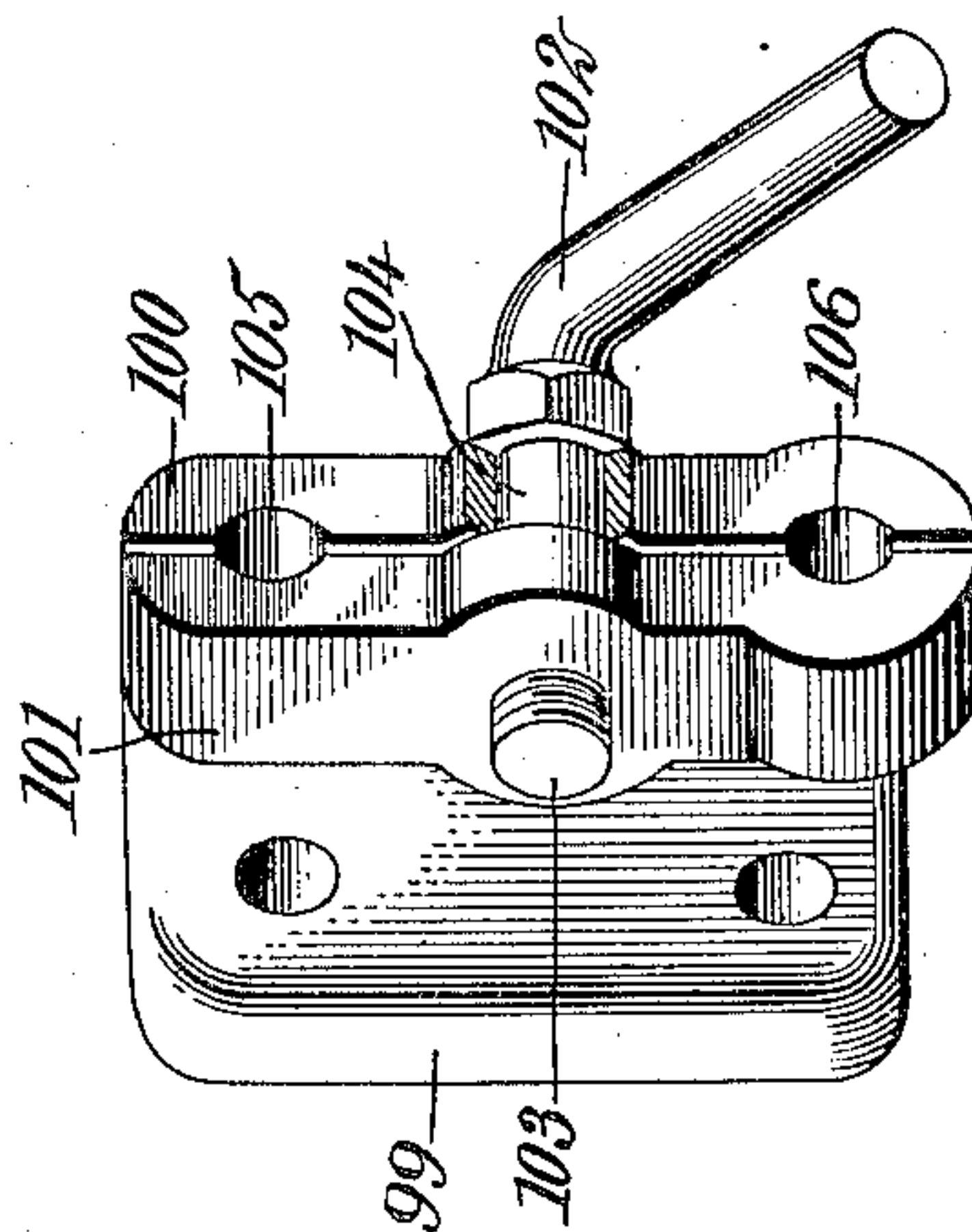
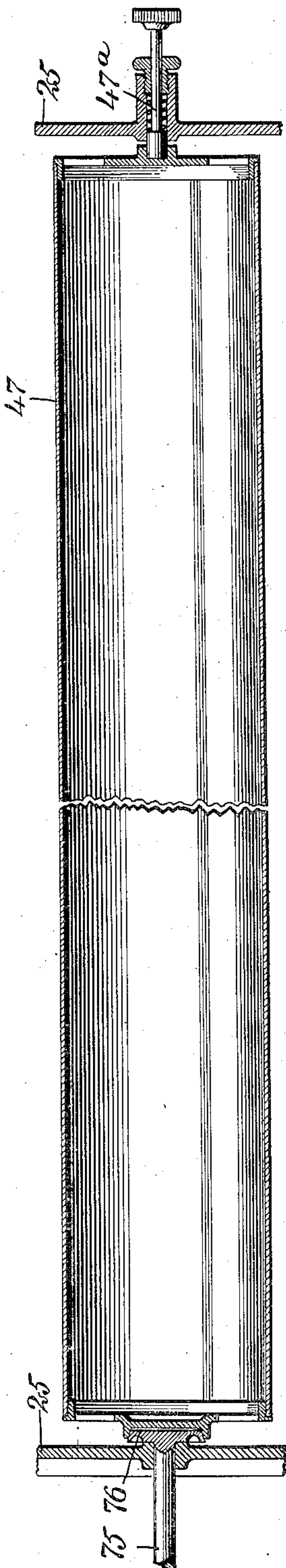


Fig. 8.

INVENTORS
Thaddeus Ellis
George H. Purvis
John S. Creech
BY *Mumford*
ATTORNEYS

T. ELLIS, G. H. PURVIS & J. S. CREECH.

AUTOMATIC TRACK INSPECTOR.

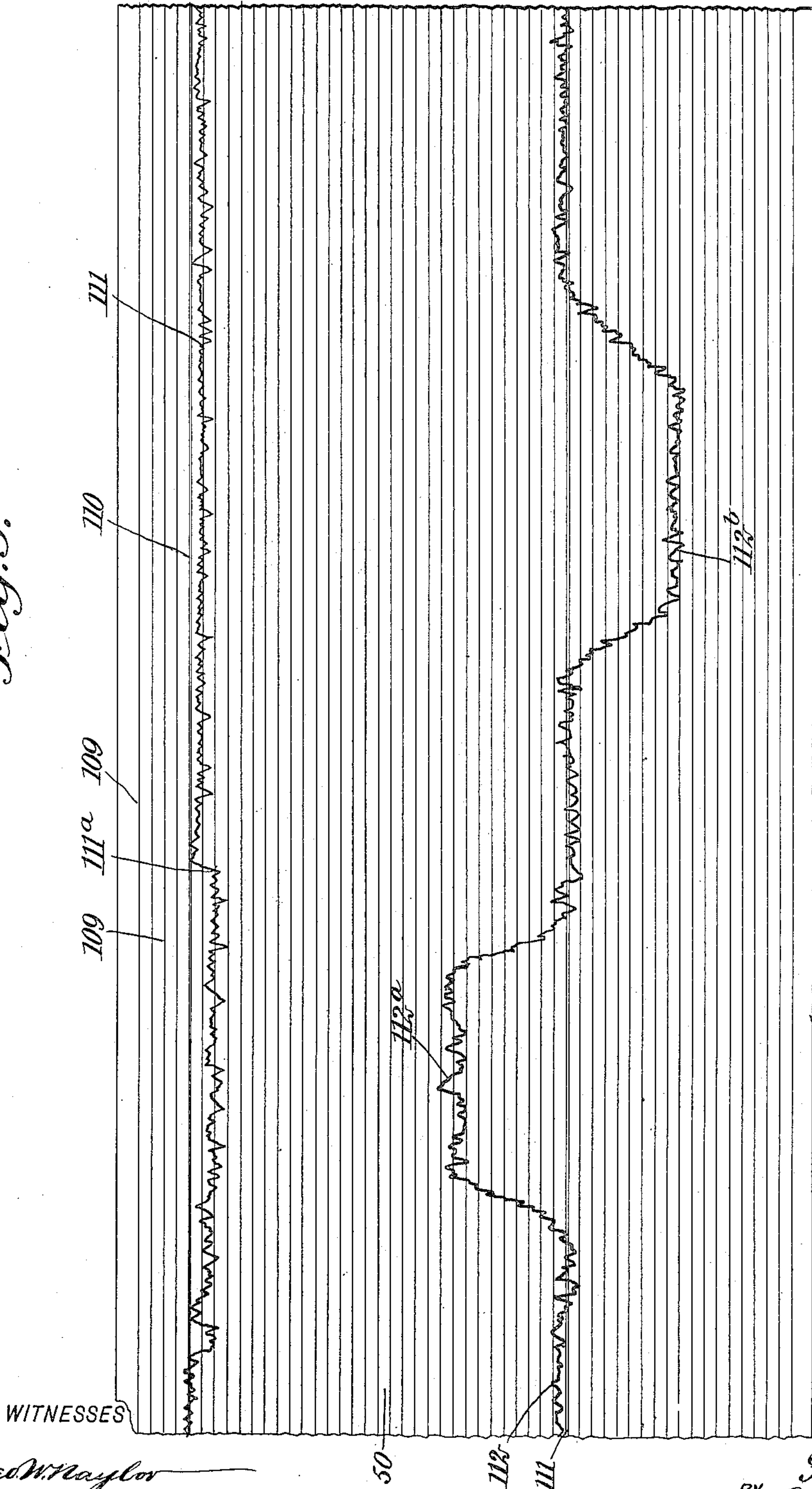
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5 SHEETS—SHEET 5.

Fig. 9.



WITNESSES

Geo. W. Taylor
Walton Harrison.

INVENTORS

Thaddeus Ellis
George H. Purvis
John S. Creech

BY

Mumford Co.

ATTORNEYS

UNITED STATES PATENT OFFICE.

THADDEUS ELLIS, OF TACOMA, GEORGE H. PURVIS, OF SEATTLE, AND JOHN S. CREECH,
OF RAYMOND, WASHINGTON.

AUTOMATIC TRACK-INSPECTOR.

938,993.

Specification of Letters Patent.

Patented Nov. 2, 1909.

Application filed January 5, 1909. Serial No. 470,800.

To all whom it may concern:

Be it known that we, THADDEUS ELLIS, GEORGE H. PURVIS, and JOHN S. CREECH, citizens of the United States, and residents, respectively, of Tacoma, in the county of Pierce and State of Washington, Seattle, in the county of King and State of Washington, and Raymond, in the county of Pacific 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 automatic track inspectors, that is, to mechanism for indicating the condition of a railway track.

More particularly stated our invention comprises various improvements, whereby the general efficiency of such mechanism is greatly increased and the operations rendered more practicable.

Reference is to be had to the accompanying drawings forming a part of this specification, in which drawings like characters of reference indicate like parts throughout the views, and in which—

Figure 1 is a side elevation showing the track inspector, which comprises a frame mounted upon wheels and adapted to be carried thereby along a railway track, this view further showing the casing for holding certain movable parts and the gearing for actuating such parts; Fig. 2 is a plan view of the track inspector when ready for use; Fig. 3 is a front elevation of the same, the rails upon which it is supported being shown in section; Fig. 4 is an enlarged section through the casing taken on the line 4—4 of Fig. 5, looking in the direction of the arrow, and showing part of the recording mechanism used for making records of the condition of the track; Fig. 5 is a vertical section upon the line 5—5 of Fig. 4, looking in the direction of the arrow, and showing the principal portion of the recording mechanism; Fig. 6 is a detail showing in section the telescopic axle used for measuring the width of the track while the machine is in action; Fig. 7 is a detail showing a rotating drum used in connection with the recording ribbon and carbon ribbon, this drum having a friction drive for the purpose of compensating for inequalities in the length of the travel of the

recording ribbon and carbon ribbon; Fig. 8 is a detail showing in enlarged elevation a clamp to be mounted upon a casing for the purpose of locking certain movable parts rigidly in relation to the casing when the apparatus is to be lifted from the track; and Fig. 9 is a plan view of a ribbon carrying a record made by the automatic track inspector.

A frame work 10, having generally the form of the frame work used on a railroad velocipede, is provided with braces 11, 12, and with arches 13, 14, these parts being preferably constructed of metal. Spacing rods 15, 16 connect the arches 13, 14 together. A pendulum 17 is mounted upon a pendulum rod 18, the latter being suspended from a spacing pin 19. The pendulum 17 carries a yoke 20 which engages a rod 21, and is adapted to move the latter in the general direction of the length thereof. Set collars 22, 23 are mounted upon the sliding rod 21 and disposed on opposite sides of the yoke 20. The sliding rod 21 extends through a bracket 24 which serves as a bearing for it. The sliding rod 21 also extends through the frame into a casing 25, the latter being mounted upon the frame work. This casing is provided with a dash pot 26 which acts as a buffer for the sliding rod 21. Mounted within the casing 25 are two guide rods 27 disposed upon the same horizontal plane, see Figs. 4 and 5. Slidably engaging these guide rods and mounted rigidly upon the sliding shaft 21 is a carriage 28. Pivottally connected with this carriage is a stylus arm 29 carrying a stylus 30. Another carriage 31 slidably engages the guide rods 27. The carriage last mentioned is provided with an arm 32 depending from it, and upon the lower end of this arm is a cylindrical portion 33, which is secured rigidly upon a slide rod 34. The arm 32 is provided with an eye 35 encircling the slide rod 21 but having no connection with the latter.

Mounted upon the carriage 31 by aid of a pivot 36 is a stylus arm 37 carrying a stylus 38. The stylus arm 37 is provided with a boss 39 upon which presses a leaf spring 40. This leaf spring is mounted upon a pin 41 and is engaged by a thumb nut 42. A spiral spring 43 engages the

under side of the leaf spring and presses upwardly against the same so as to keep the leaf spring in firm engagement with the boss 39. The operator, by turning the nut 41, may gage the pressure of the leaf spring 40 upon the boss 39, and consequently regulate at will the pressure of the stylus 38. A spiral spring 44, corresponding to the spiral spring 43, bears a similar relation to the stylus arm 29 that the spiral spring 43 bears to the stylus arm 37. In fact, the stylus 30 is exactly like the stylus 38, and all the parts immediately associated with the one are duplicated in the other. These styluses may be further adjusted by aid of thumb screws 45, 46, as will be understood from Fig. 5.

Mounted centrally within the casing 25 is a revoluble drum 47, acted on by a spring-pressed plunger 47^a, and immediately adjacent to this drum is a roller 48, acted on by a plunger 48^a, having the same function as the plunger 47^a. A ribbon 49, of paper, is wound upon the roller 48. A ribbon 50, of carbonized paper, engages the ribbon 49 and is used in making the record. A roller 51 is engaged by the carbon ribbon 50 and is mounted upon the ends of two levers 52, the latter being journaled upon pivot pins 53, and provided with weights 54 for holding the levers in normal position. A roller 55 is journaled within the casing 25 and from this roller the paper 49 is gradually unwound. The roller 55 is acted on by a plunger 55^a, having the same function as the plungers 47^a and 48^a. The carbon ribbon 50 passes partially around this roller 55. A tension roller 56 is journaled upon the free ends of two levers 57, the latter being mounted upon pivot pins 58. Leaf springs 59 engage the levers 57 and tend to press the same downwardly. A ruling roller 60 is provided with ruler rings 61, adapted to slightly impress the carbon ribbon 50 upon the record ribbon 49, so as to leave upon the ribbon last mentioned a number of parallel lines as the ribbon moves along. This can be understood by reference to Fig. 9.

A window 62 is provided in the casing 25, in order to enable the operator to inspect the mechanism inside of the casing whenever desired. A rocking stylus 63 is provided with a weight 64, for holding it in normal position, and is journaled upon one of the guide-rods 27. A cord 65 is connected with the weight 64 and extends out of the casing; the operator, by pulling this cord 65, actuates the rocking stylus 63 and may cause the latter to imprint the character through the carbon ribbon 50 upon the record ribbon 49. The operator, upon reaching a mile post as the machine is drawn along the railway track, pulls the cord 65, thereby indicating upon the record paper

the fact that the machine has traveled a mile, and consequently securing data from which the position of the machine relatively to the starting point may be easily reckoned.

A track wheel 66 (see Fig. 2) is mounted upon a stub shaft 67 and this stub shaft carries a worm 68. A worm wheel is shown at 69 and is mounted upon a shaft 70. This shaft at its opposite end is provided with a worm 71 which engages a worm wheel 72. Meshing with this worm wheel is a pinion 73 supported by aid of a bearing sleeve 74, and mounted directly upon a revoluble shaft 74^a extending through this bearing sleeve, see Fig. 5. The worm wheel 72 is mounted upon a shaft 75, the latter being supported by brackets 77, as will be understood from Fig. 3. Motion is communicated from the shaft 75 to the drum 47 by aid of a friction drive 76.

The rails of a railway are shown at 78, 79, and engaging the same are service wheels 80, 81, provided with flanges 82, 83, running inside of and pressing slightly outward against the rails 78, 79. The wheel 80 is mounted upon a stub shaft 84 (see Fig. 6), the latter being integral with a cylindrical head 85. This cylindrical head is mounted within a barrel 86 of cylindrical form. Disposed within this barrel and engaging the head 85 is a spiral spring 87. Mounted within the barrel 86 and movable relatively to the same is a smaller barrel 88, these two parts telescoping together, as will be understood from Fig. 6. Mounted within the barrel 88 is a plunger 89 which is pressed upon by the spiral spring 87. This plunger engages a pin 90 having a stub shaft 91 integral with it, this stub shaft mating the stub shaft 84. A set collar 92 is mounted rigidly upon the inner barrel 88. Another set collar 93 is mounted rigidly upon the stub shaft 91 and serves as a limiting stop for the pin 90, as will be understood from Fig. 6. Connected with the set collar 92 is the slide rod 34 which extends into the casing, and connects with the eye 35 as above described. Mounted rigidly upon the barrel 86 are set collars 94, 95, 96, 97 and 98 for the purpose of supporting the frame work. Mounted upon the casing 25 is a base 99, see Fig. 9, carrying a clamp 100. This clamp is provided with a movable jaw 101 and with a hand lever 102 for actuating this movable jaw. The hand lever 102 is provided with a threaded portion 103 extending through the jaw 101 and adapted to actuate the same. The portion 104 of the lever 102 is smooth and fits in a corresponding smooth opening in the jaw 100. The clamp 100 and its jaw 101 are together provided with openings 105, 106, and through these openings extend the sliding rods 21, 34. The purpose of this arrangement is to enable

the operator by simply turning the hand lever 102 to grip the slide rods 21, 34 tightly in position so as to prevent undue motion among the movable parts within the casing.

5 This is desirable in instances where the machine is subjected to unusually heavy jolting, and also where it becomes necessary to lift the machine from the track, as for instance when a train has arrived.

10 An opening 107 bounded by a ring 108 is provided for the purpose of enabling the operator to take out the record sheet when finished, and also to reach the various operating parts within the casing. A portion
15 of the record ribbon 50 is shown in Fig. 9. The lines made by the ruler rings 61 are shown at 109. At 110, 110^a are lines of a different character which may, if desired, be made permanently upon the record ribbon before the latter is put into the machine.
20 The line 110 represents the gage or width of the track; that is to say, the stylus 38 should follow approximately the line 110 if the gage of the track is absolutely uniform and otherwise perfect. Of course, in practice no
25 such ideal conditions obtain and the result is that the stylus in question makes a zig zag line 110^a. The variations of this zig zag line from the normal or ideal line 110 represent departures from the proper gage
30 or distance between the rails. The line 110^a is independent of the width of the track as regards the relative level of the rails. If both rails were of the same level and the
35 track otherwise perfect the stylus 30 should follow the line 110^a. Since, however, the two rails are seldom absolutely level on any given point along the track, the record made by the stylus 30 is a zig zag line 112.
40 If there be a close difference in the relative levels of the two rails the line 112 may vary considerably from this ideal position; for instance as shown at 112^a, 112^b the record line may swerve a considerable distance
45 from the line 110^a. In this instance the irregular curves 112^a, 112^b represent the differences in level between the two rails at a point where the general direction of the track is in sinuous order; that is, the track
50 first bends abruptly in one direction, and a little farther along bends abruptly in the opposite direction. The irregularity in the line 110^a, see the point 111^a, shows that the rails are too close together at this point.

55 The operation of our device is as follows: The operator secures the record ribbon and carbon ribbon in place as above described, drawing the record ribbon 49 upon the roller 48, and leaving most of the record ribbon
60 wound upon the roller 55. He next adjusts the two styluses and otherwise gets the movable parts of the machine in good condition. The device now being placed upon the rails, is carried bodily along the track.

This may be done by securing the machine 65 directly to a hand car, or by pushing it along in the manner of a hand car, as desired. Whenever the machine passes a mile post the operator pulls the cord 65 and thus indicates upon the record the position occu- 70
pied by the machine. The stylus marks the two record lines 110^a, 112 with irregularities 111^a, 112^a, 112^b thereby making a perfect record of the condition of the track. This
75 record may afterward be examined and any structural faults disclosed by it may be remedied in an appropriate manner.

From the above description it will be noted that our invention comprises essentially a small car having a frame work and a cas- 80
ing supported by the frame work, and various working parts mounted within the casing.

Having thus described our invention, what we claim as new and desire to secure by Let- 85
ters Patent is:

1. A device of the character described, comprising a frame work mounted upon wheels to be dragged along a railway track, mechanism controllable by the condition of 90
said railway track for recording said condition thereof, said mechanism including slide rods, and a clamp disposed adjacent to said slide rods, said clamp being controllable at will for gripping said slide rods and for re- 95
leasing the same in order to prevent undue motion of said slide rods.

2. A device of the character described, comprising a frame work, a casing supported thereby, recording mechanism mounted 100
within said casing, means controllable by the condition of a railway track for actuating said recording mechanism, said means including a plurality of slide rods, and a clamp mounted upon said casing and provided with 105
portions for engaging said slide rods in order to temporarily grip the same.

3. The combination of a frame mounted upon wheels, a pendulum supported by said frame and adapted to swing, a rod disposed 110
below said pendulum, a member mounted upon said pendulum and engaging said rod for the purpose of actuating the latter, limiting stops mounted upon said rod and adjustable at will for the purpose of adjusting 115
the position of said rod relatively to said pendulum, and means controllable by motions of said rod for recording movements of said pendulum relatively to said frame.

4. A device of the character described, 120
comprising a frame mounted upon wheels and adapted to be drawn along a track, a pendulum mounted upon said frame, a rod slidably mounted upon said frame and connected with said pendulum, a dash pot for 125
preventing excessive movements of said rod, mechanism controllable by the condition of said track for actuating said pendulum rel-

atively to said frame, and recording mechanism controllable by said pendulum for recording the condition of said track.

5 The combination of a frame mounted upon wheels and adapted to be moved along a track, said frame being provided with a telescopic axle made in concentric parts, means controllable by differences in the width of the track for lengthening and
10 shortening said telescopic axle, and recording mechanism for indicating the varying width of said track.

6. The combination of a frame mounted upon wheels and adapted to be drawn along
15 a track, a telescopic axle mounted upon said frame and made up of members movable relatively to each other, a rod connected rigidly with one of said members, said rod being movable relatively to others of said
20 members, and means mounted upon said

frame and controllable by said rod for indicating differences in the width of said track.

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

THADDEUS ELLIS.
GEORGE H. PURVIS.
JOHN S. CREECH.

Witnesses to the signature of Thaddeus Ellis:

GUY COX,
P. DAHL.

Witnesses to the signature of George H. Purvis:

G. H. BUCEY,
E. A. COOK.

Witnesses to the signature of John S. Creech:

JOHN FINUELL,
J. R. LANCASTER.