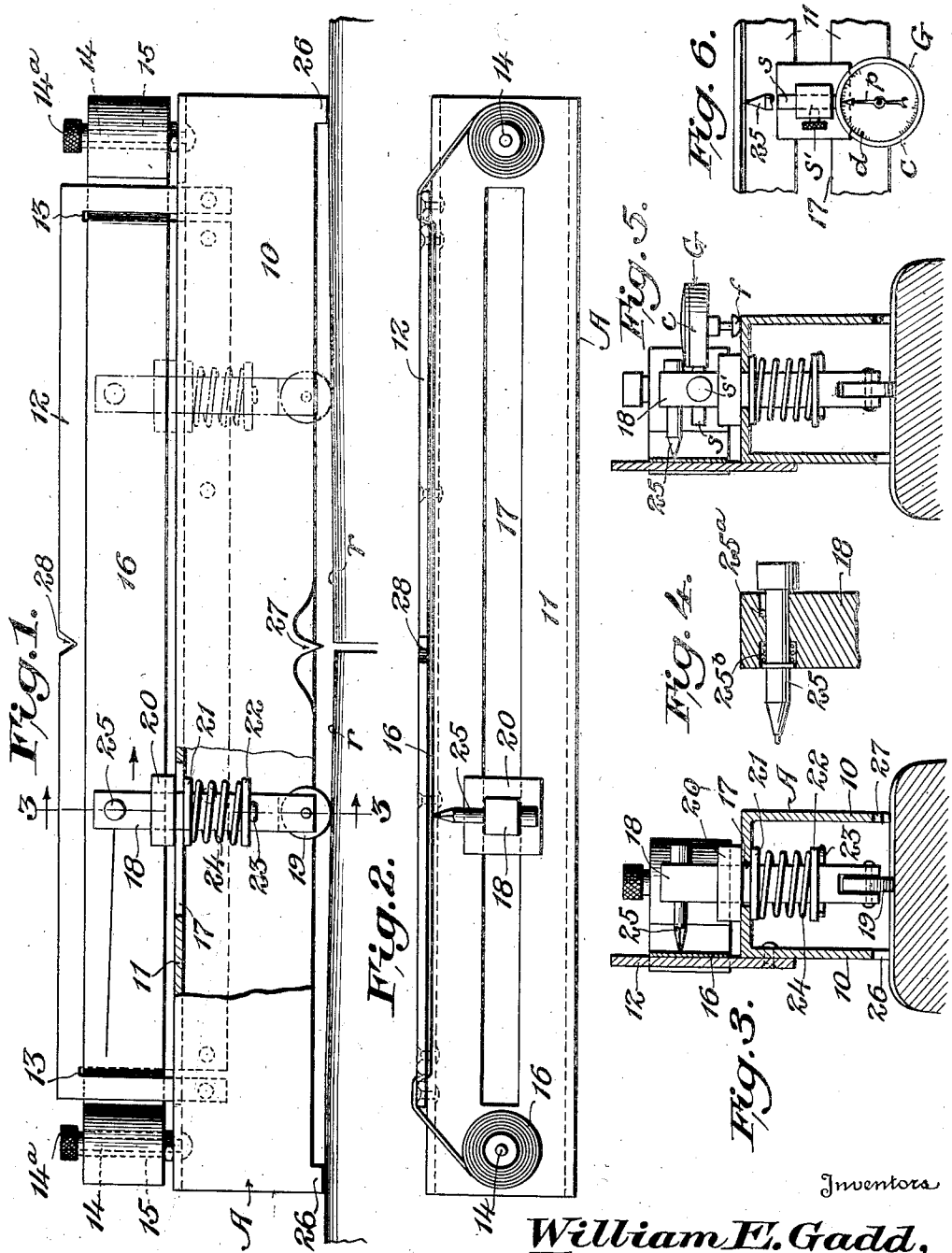
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RAIL GRAPH PRODUCING DEVICE

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RAIL GRAPH PRODUCING DEVICE

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This invention relates to a device for use in preparing graphs or diagrams to indicate and record irregularities in surfaces, and has particular reference to a device especially designed for use in preparing graphs or diagrams to record deflection and wear in the profile or top surfaces of railway rails.

In the art of track maintenance there has developed to a considerable extent the practice of reconditioning worn and battered rail ends by a welding process involving the building up of the worn and battered areas by the application of compensating metal thereto. In order that this work may be performed efficiently and accurately it is the practice to prepare graphs or diagrams indicative of the worn and battered condition of the rails for the guidance of the workmen, and heretofore, the preparation of these graphs or diagrams usually has been effected by the aid of a straightedge and a taper gauge. This method of preparing the graphs or diagrams is, however, quite tedious and time consuming in that it involves an elaborate procedure of numerous measurements and notations. Moreover, it is further objectionable because of the chances of error involved in the manual taking of the measurements and the making of the notations.

Accordingly, the general object of the invention is to provide a simple, inexpensive device whereby graphs or diagrams indicative of irregularities in surfaces, especially in the profile surfaces of rails, either for the use of workmen in reconditioning the rails or for rail wear record purposes, may be produced quickly and easily and with extreme accuracy.

With the foregoing general object and various other purposes in view, which will become more fully apparent as the nature of the invention is better understood, the same consists in a device embodying the novel features of construction and the novel combination and arrangement of parts as will be hereinafter more fully described, illustrated in the accompanying drawing and defined in the appended claims.

In the drawing, wherein like characters of reference denote corresponding parts in the different views:—

Figure 1 is a front elevation of the device, partly broken away and illustrating the use thereof.

Figure 2 is a top plan view.

Figure 3 is a transverse section through the device,

Figure 4 is a detail view illustrating one way of mounting the marking implement.

Figure 5 is a view similar to Fig. 3 illustrating the application of a gauge to the device; and

Figure 6 is a plan view illustrating the gauge.

Referring in detail to one practical embodiment of the invention as illustrated in the drawing, it will be observed that the device is inclusive essentially of a supporting base, designated generally as A, which, as shown, preferably is in the form of a channel member of suitable length, depth and width, open at its bottom and having side walls 10 and a top wall 11, the top surface of which is planar.

Extending upwardly from the rear side of the base A, or from the top 11 of the base near the rear side thereof, either as an integral part of the base or as an element separate therefrom and suitably attached thereto, as by riveting or welding, is a vertical platen or plate 12 of suitable height and of a length such that it terminates at its ends adjacent to but inwardly of the ends of the base.

Formed through the plate 12 near each end thereof is a narrow, vertical guide slot 13, while rising from the top wall 11 of the base near each end thereof is a pin 14.

On one of the pins 14 is mounted a spool 15 having a recording strip 16 of paper or other suitable material rolled thereon, while on the other pin 14 is mounted a second spool 15 onto which the strip 16, after having first been threaded through the slots 13 and across the front face of the plate 12, is to be rolled. In this connection the pins 14 may be fixed to the base and the spools 15 may be rotatably mounted thereon and may be provided with suitable finger engageable formations to effect their rotation, or, alternatively, the pins may be rotatably mounted on the base and may be provided with suitable finger knob formations 14a, to effect their rotation and the spools may be non-rotatably engaged with said pins, as shown. In either event, to prepare the device for use the spools are mounted on the pins and the recording strip 16, is, as aforesaid, partially unwound from the first mentioned spool, passed forwardly through the adjacent slot 13, extended across the front of the platen-plate 12 and rearwardly through the other slot 13 and finally attached in any suitable manner to the second mentioned roll. Thus, the section of the recording strip exposed at the front of the plate 12 between the slots 13, 13 is adapted to

be marked to constitute a graph or diagram, and when the making of one graph or diagram has been completed a new section of the recording strip to be marked to constitute a second graph or diagram is brought into operative position across the front of the plate 12 between the slots 13, 13 simply by rotating the second mentioned spool 15 to wind the previously marked strip section thereon. Thus, also, when finally the entire strip 16 has been used in making graphs or diagrams, the latter all are wound as a continuous suitably notated record strip on the second mentioned spool.

Formed in the top wall 11 of the base A and extending substantially throughout the length of said wall is a slot 17, and in this slot is disposed an arm 18 which may have flat side faces and which is of a width to neatly fit said slot whereby it is held against rotation, but is, however, permitted to move freely in a vertical direction as well as to be freely shifted longitudinally relative to the base.

At the bottom of the arm 18 is carried a small roller 19 for floating contact with the surface to be gauged, while on said arm, above the top wall 11 of the base A, is engaged a finger block 20 through which the arm is freely movable vertically and which is to be grasped by the hand for moving said arm longitudinally along the slot 17, the block 20 having sliding engagement at its under side with the top face of the base wall 11 to either side of the slot 17 as shown.

On the arm 18 below the top wall 11 of the base is mounted a washer 21 which engages the under face of said wall and through which the arm is freely slidable, while between this washer and a suitable stop or abutment 22 at a lower point on the arm, which stop or abutment may be constituted by a second washer held against downward movement relative to the arm by a cotter pin 23 extending through the arm, is interposed a light expansion coil spring 24 which tends constantly to urge the arm 18 downwardly.

Near its upper end the arm 18 carries a suitable marking implement or stylus 25 such as a lead pencil, which extends rearwardly from said arm for cooperation with the portion of the strip 16 which is exposed at the front of the plate 12, the said marking implement preferably being mounted on the arm 18 in such manner, not entering into the invention, that it may be held normally retracted and disengaged from the strip 16, as by the stop 25^a, for projection when released, into yieldable engagement with said strip as by the spring 25^b, as suggested for instance in Fig. 4. The stop 25^a is carried by the pencil and when the pencil is rotated to aline said stop with the recess shown in the arm 18 the spring 25^b acts to project the pencil. The pencil is manually retractable against the force of the spring 25^b and when retracted and rotated to disaline the stop 25^a from said recess the stop then bears against the front face of the arm 18 and holds the pencil retracted.

Preferably the side walls 10 of the base A are provided at or near their ends with depending foot formations 26 of short length for engagement with the top or profile surfaces of the rails to non-rockably support the device thereon. Moreover, the front side wall 10 is suitably cut away to provide a centering pointer 27 midway between the ends of the base, or said wall otherwise is formed or marked to provide an index for centering alinement with the gap between the rail ends to facilitate proper positioning of the device on the rails with relation to the joint between the rail ends, while in vertical alinement with the pointer or index 27 the plate 12 is notched as indicated at 28 or otherwise is indexed as a guide to marking or indexing the exposed strip section 16.

In the use of the device, assuming that a section of the recording strip 16 has been positioned across the front of the platen 12 as shown, the arm 18 with the pencil 25 held retracted is moved to one end of the slot 17 and the base A is placed upon the rails R, R, with the pointer 27 alined with the gap between the rail ends and the foot formations 26 engaging substantially unworn portions of the rails beyond the worn or battered portions thereof indicated as *r*. The pencil 25 then is released to engage the recording strip 16 and the arm 18 is moved slowly towards the other end of the slot 17. Under the influence of the spring 24 the roller 19 follows the contour of the worn or battered profile surfaces of the rails and consequently, through the arm 18, controls vertical movements of the pencil 25, so that, when the arm 18 finally has reached the second mentioned end of the slot 17, there has been marked on the recording strip section 16 a line which corresponds exactly to the contour of the worn or battered profile portions of the rails. By the aid of the index 28 the graph or diagram thus produced is marked or indexed at a definite point corresponding to the position of the pointer 27 relative to the rails. Identification data and such notations as may be necessary or desired then are placed on the graph or diagram to complete the same, whereupon a new section of the strip 16 is brought into position across the front of the plate 12 for the making of another graph or diagram.

The base of the device may be and preferably is of such less width than a rail that the device may be shifted laterally relative to the rail to obtain profile graphs or diagrams indicative of worn or battered conditions adjacent to the sides of the rail. Moreover, the slot 17 may, if desired, be formed nearer to one side than the other of the base so that by reversing the device end for end graphs or diagrams indicative of rail profile conditions quite closely adjacent to the sides of the rails may be obtained.

The recording strip 16 may, if desired, be in the form of strips of graph paper ruled horizontally and vertically, but this obviously is not necessary since a worn profile condition indicated by any particular graph or diagram may readily be ascertained from the graph or diagram simply by drawing a straight line between the high points of the diagram at the ends thereof.

When finally the entire recording strip 16 has been utilized in making graphs or diagrams and the latter have been rolled onto the strip receiving spool, a compact, unitary record, convenient for use and storage and indicative of worn rail conditions at a plurality of separate locations is obtained.

Figures 5 and 6 of the drawing illustrate a preferable construction which includes an indicating gauge in conjunction with the recording device heretofore described to indicate the extent of the irregularities in the surface being recorded and by means of which accurate notations of deflection and wear may be made. While an indicating gauge of any construction and mode of operation suitable for use with the device may be employed, the gauge illustrated in the present instance and designated generally as G is of a

known type, as disclosed for example in Reisner Patent No. 1,419,306, wherein longitudinal movement of a foot *f* relative to a casing *c* effects rotation of a pointer *p* over a dial *d* to indicate in thousandths of an inch endwise movement of the foot relative to the casing. The casing *c* is provided with a supporting stem *s*, and in accordance with the invention this stem is engaged in an opening in the arm 18 and is secured therein as, for example, by means of a set screw *s'*, whereby the indicating gauge is affixed to said arm for movement therewith. The indicating gauge is disposed to have its foot *f* track over the planar upper face of the top wall 11 of the base A. Consequently, when the arm 18 is moved along the slot 17 and is raised or lowered in accordance with irregularities in the surface engaged by the roller 19, the indicating gauge is correspondingly raised or lowered and, due to the cooperation of the foot *f* with the planar surface of the body wall 11, the indicating gauge accurately indicates the extent of the irregularities. Preferably the strip 15 is vertically ruled at suitably spaced intervals, and when using the indicating gauge G the strip is brought to a position with one of its ruled lines alined with the indices 28, 27, the latter of which is alined with the gap between the rail ends. Said line then is suitably marked or identified, whereafter the arm 18 is moved along the base A and the amount of rail profile wear or deflection as indicated by the gauge G at different points in its movement with said arm is noted on the strip having the rail profile inscribed thereon as described. The vertical lines on the strip serve as a convenient guide for the making of such notations. Thus, an extremely accurate graph or diagram indicative of the deflected, worn and battered conditions of the profile surfaces of the rails of a rail joint may readily and easily be made.

I claim:—

1. A device especially designed for use in producing graphs indicating the condition of the tops of railway rails, said device comprising a base to be supported upon the tops of the rails, a vertically disposed plate carried by said base, said plate having a vertical slot near each end thereof, spools at the ends of the base, a record strip wound at its ends on said spools and extending from said spools forwardly through the slots in said plate across the front face of the plate, a rail top surface follower mounted on the base for movement longitudinally therealong and also for movement in a direction normal to the base, and a marking element carried by said surface follower member for cooperation with a section of said strip exposed at the front of said plate.

2. A device especially designed for use in producing graphs indicating the condition of the tops of railway rails, said device comprising a base of inverted U-shape in cross section to be supported upon the tops of the rails, said base having a longitudinally slotted top wall, a plate rising from the base to support a strip to be marked, a rail top surface follower member disposed in the slot of said top wall for movement both longitudinally of and in a direction normal to the base, an abutment on said member below said top wall, a spring housed within said base between the top wall thereof and said abutment to maintain the follower member engaged with the surface, and a marking element carried by said surface follower member for cooperation with a strip supported by said plate.

3. A device especially designed for use in producing graphs indicating the condition of the tops of railway rails, said device comprising an elongated base of inverted U-shaped cross section to be supported in a fixed position upon the tops of the rails, said base having an elongated slot in its top wall extending longitudinally of the base, a recording strip supported on said base, an arm extending through the slot of said base for engagement with the rail top surface, said arm being movable along said slot and also in a direction normal to its first mentioned direction of movement in response to irregularities in the surface, means to hold said arm against rocking movement, and a recording strip marking element carried by said arm, said arm having flat side faces engaging the edges of the walls defining said slot to hold said arm against rotation.

4. A device especially designed for use in producing graphs indicating the condition of the tops of railway rails, said device comprising an elongated base of inverted U-shaped cross section to be supported in a fixed position upon the tops of the rails, said base having an elongated slot in its top wall extending longitudinally of the base, a recording strip supported on said base, an arm extending through the slot in said base for engagement with the rail top surface, said arm being movable along the slot and also in a direction normal to its first mentioned direction of movement in response to irregularities in the surface, a recording strip marking element carried by said arm, said arm having flat side surfaces engaging the edges of the walls defining said slot to hold the arm against rotation, an abutment on said arm below the top wall of the base, an expansion coil spring on said arm between the top wall of the base and said abutment to urge the arm into engagement with the surface and to maintain the arm disposed perpendicularly relative to the base, and a member for manual manipulation to move the arm along said slot, said member being slidably engaged with the upper face of the base and having the arm slidably engaged therethrough.

5. A device specially designed for use in producing graphs indicating the condition of the tops of railway rails at their ends, said device comprising an elongated base of inverted U-shape in cross section to be supported upon the rails spanning the space between the rail ends, said base having means approximately midway between its ends for alinement with the space between the rail ends as a guide for positioning the base with end portions thereof of substantially equal length overlying the respective rail ends, said base having an elongated slot in its top wall extending longitudinally of the base, a vertically disposed plate rising from the base and extending substantially from end to end thereof to one side of said slot, a recording strip extending across the front face of said plate, a vertical arm extending through the slot in the top wall of said base for movement along said slot and also for vertical movement, an abutment on said arm below the top wall of the base, a spring between said abutment and the top wall of the base to urge said arm constantly downward into engagement with the top surface of one or the other of the rails, a marking element carried by said arm for marking said recording strip, said plate having means vertically alined with the base positioning means as a guide for indexing the recording strip, and a member slidably engaging the top face of the top wall of the

base and having the arm extending slidably therethrough for finger manipulation to move the arm along the slot in the top wall of the base.

6. A device especially designed for use in producing graphs indicating the condition of the tops of railway rails, said device comprising a base having a straight top surface and means for engagement with the rail to support the top of the base above the rail, the top of the base having an elongated longitudinally extending slot, means rising from the base at one side of said slot for supporting a record sheet, a vertical arm extending through said slot for movement therealong and also for vertical movement, spring means tending constantly to urge said arm downwardly into engagement with the top surface of a rail on which the base is supported whereby, upon the arm being moved along said slot, it rises and falls responsive to irregularities in the top surface of the rail, a marking element carried by said arm for marking the record sheet, and a gauge carried by said arm and having a contact element cooperating with the straight top surface of the base to indicate the exact amount of elevation or depression in the top surface of the rail relative to the straight top surface of the base for any position of adjustment of the arm longitudinally along said slot.

7. A device for use in producing graphs indicating the condition of the tops of railway rails, said device comprising a base to be supported upon a rail, means carried by said base for supporting a record sheet, a vertical arm mounted on said base for movement therealong and also for vertical movement, means tending constantly to urge said arm downwardly into engagement with the top surface of a rail on which the base is supported whereby, upon movement of the arm along the base, the arm rises and falls responsive to irregularities in said surface, a marking element carried by said arm for marking the record sheet, the base having a straight top surface extending longitudinally thereof, and a gauge carried by said arm and having a contact element cooperating with the said straight top surface of the base to indicate the exact amount of elevation or depression of the top surface of the rail relative to the straight top surface of the base for any position of adjustment of the arm longitudinally along the base.

8. A device for graphically recording the worn profile of the treads of railway rails on a record strip, comprising in combination a supporting base having means for positioning the same on the rails and also provided with a planar tracking surface, a platen carried by the base and providing a guiding support for the record strip, a vertically moving gauge member having a shiftable engagement with the base longitudinally thereof, profile marking means carried by said gauge member, and an indicator also carried by and with said gauge member and having its actuator engaging said tracking surface of the base to cause visual numerical indications of the degree of wear recorded by the profile marking means.

9. A device for graphically recording the worn profile of the treads of railway rails on a record strip, comprising in combination a supporting base having means for positioning the base on the rails, a platen carried by the base and providing a guiding support for the record strip, and a yieldingly depressed vertically movable gauge member having a shiftable engagement with the base longitudinally thereof and carrying profile marking means and an indicating gauge both actuated by the vertical movement thereof.

10. A device for graphically recording the worn profile of the treads of railway rails on a record strip, comprising in combination a supporting base having means for positioning the same on the rails and also provided with means for centering the base with relation to the joint between the meeting rail ends, a platen carried by the base and providing a guiding support for the record strip, and a yieldingly depressed vertically movable gauge member having a shifting engagement with the base longitudinally thereof and carrying profile marking means and an indicating gauge both actuated by the vertical movement thereof.

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