

March 23, 1954

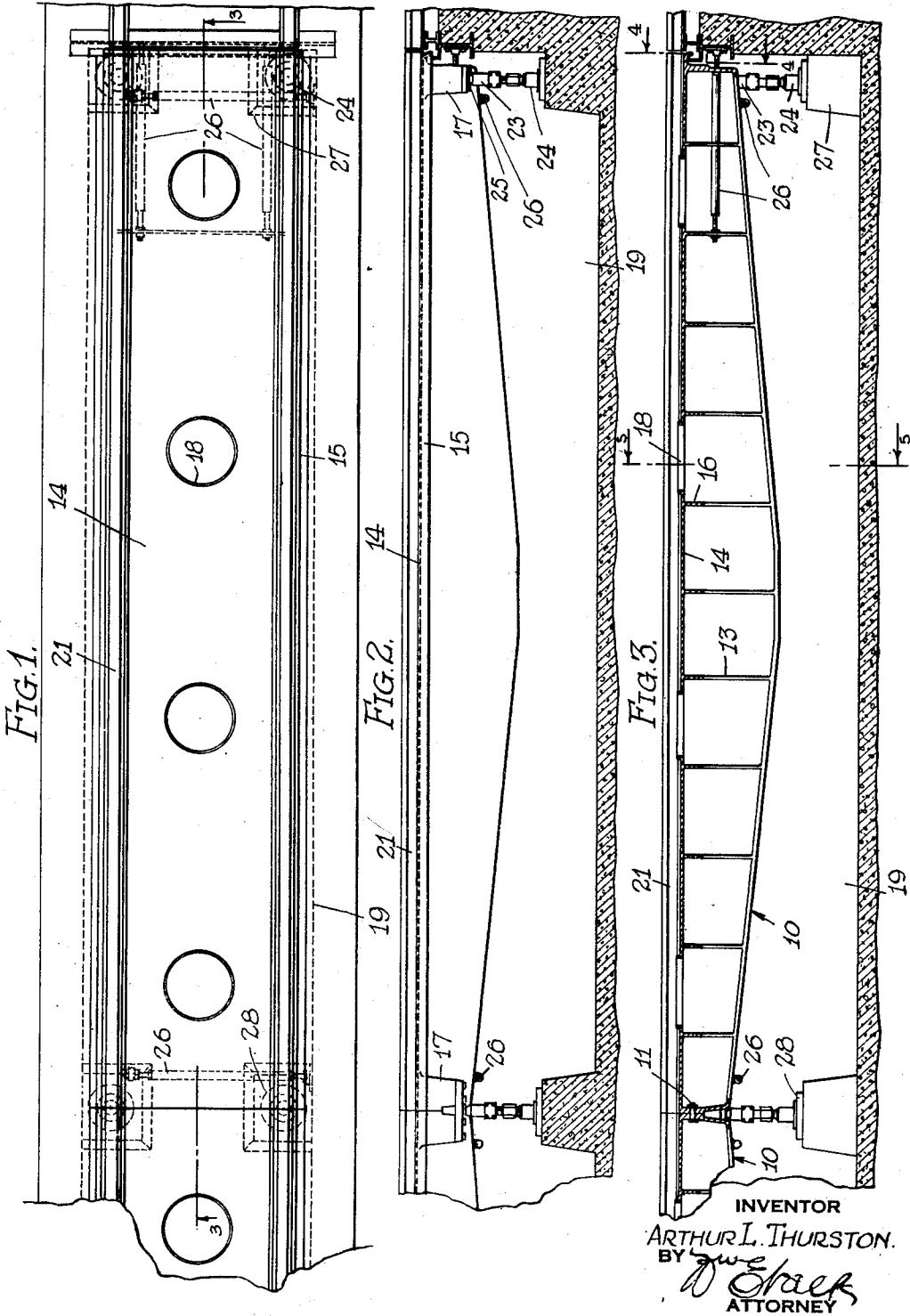
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RAILROAD TRACK-SCALE ASSEMBLY

Filed June 29, 1951

2 Sheets-Sheet 1



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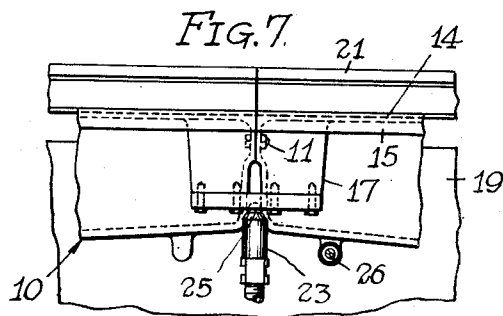
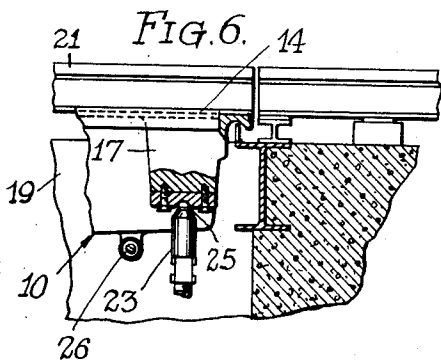
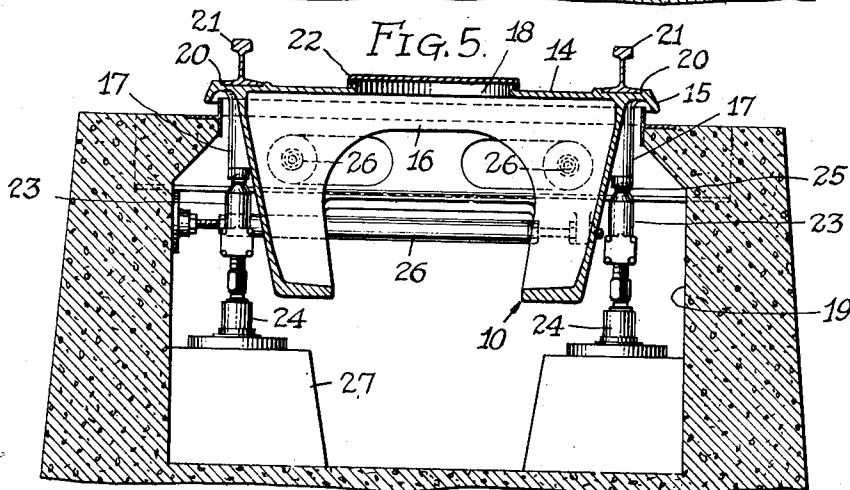
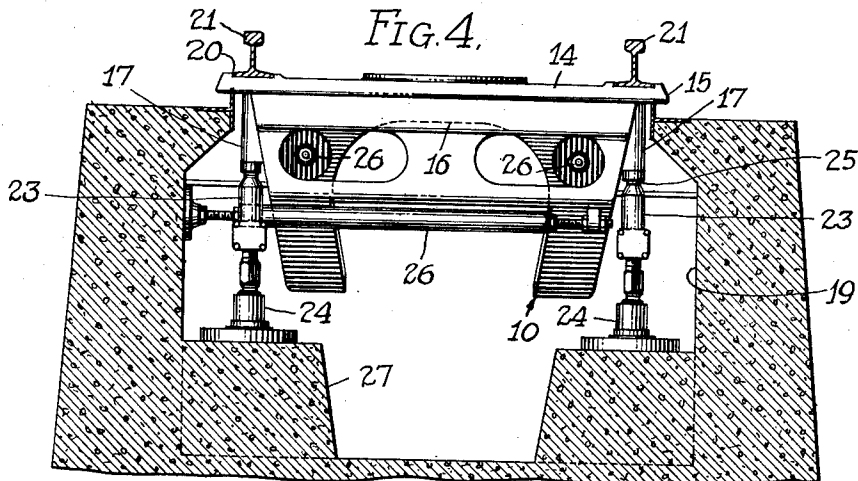
A. L. THURSTON

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INVENTOR
ARTHUR L. THURSTON.
BY *W. E. Black*
ATTORNEY

UNITED STATES PATENT OFFICE

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RAILROAD TRACK-SCALE ASSEMBLY

Arthur L. Thurston, Wantagh, N. Y., assignor to
Cox and Stevens Aircraft Corporation, a corporation of New York

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4 Claims. (Cl. 265—71)

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My invention relates to a railroad track-scale assembly comprising a weighing-unit or sub-assembly, a weigh-bridge, and a pit across which the weigh-bridge is adapted to extend.

At the present time it is the almost universal practice to build a track-scale with a so-called rigid deck supported by beams which extend crosswise the pit and which are supported at their ends on the pit side walls. It is also customary to make the pit approximately ten feet wide and proportionately deep so as to provide ample room within the pit to manipulate the usual knife-edges and levers of the conventional balance scales. The weigh-bridge of scales thus characterized are usually constructed of two main girders running lengthwise the scale below the deck beams, with so-called rail-chairs rising thru openings in the deck, and to which said chairs the live-rails of the weigh-bridge are directly fastened; the rail-chairs being appropriately tied together to prevent the rails from spreading. In addition, the weigh-bridge girders are also tied together by cross or diagonal bracing, and since the vertical distance between the rails and the check-rods which hold the weigh-bridge horizontally in place is considerable, the diagonal bracing is of necessity somewhat elaborate and complex. Moreover, since the rails, rail-chairs and weigh-bridge are movable relatively to the deck, clearance holes have to be formed in the latter, with dirt and rain guards therearound as well as along the rails, to prevent water and dirt from entering into the pit. The reason for a rigid as distinct from a non-rigid deck is that it is customary to equip the weigh-bridge with both live and dead rails (usually parallel and spaced apart about sixteen inches) onto one or the other of which the rolling stock may be switched. With knife-edge scales heavy rolling stock such as locomotives, if run onto the live rails, might very well cause damage to or blunting of the knife-edges of the scales, with the result that only cars to be weighed are presently run over the live rails—locomotives and heavy cars (not required to be weighed) being switched onto the dead rails.

An object of the present invention is to simplify the construction of the weigh-bridge as well as the pit across which the weigh-bridge extends.

A further object of the invention is to distribute to the best advantage the structural components of the weigh-bridge consistent with the loads required to be imposed thereon.

A further object of the invention is to so construct the weigh-bridge and pit as to admit of

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the use of so-called strain gauge weighing cells which are small, have relatively stationary parts, and can carry an appreciable over-load (at least three times their rated capacity) without damage or loss of accuracy.

A still further object of the invention is to so construct the track-scale assembly as to admit of the complete elimination of dead-rails, and what is more important, the complete elimination also of a separate weigh-bridge deck.

Other objects and advantages of the improved assembly include the elimination of numerous miscellaneous parts presently required in a weighing operation; the better distribution of the metal in the weigh-bridge structure to more economically carry the loads to which it is subjected in use; the ease of access to the pit thru multiple man-holes; the provision of grooves in the deck-portion of the weigh-bridge to locate and align the live weigh-bridge rails; the machining of the ends of the weigh-bridge frame members to obtain perfect alignment when more than one frame member is required; the utilization, on a grade, of an assembly in which the measuring forces may under all operating conditions be maintained perpendicular to the rails; the use of adjustable struts between the weighing cells and the weigh-bridge structure; and the elimination of auxiliary dirt and rain guards.

Still further objects and advantages of the invention will be hereinafter more fully set forth.

In the drawings, wherein like reference characters denote like or corresponding parts:

Fig. 1 is a plan view of my improved track-scale assembly, partly broken away;

Fig. 2 is a side elevation of that portion of the assembly illustrated in Fig. 1;

Fig. 3 is a longitudinal sectional view of the assembly of Fig. 1, taken on the line 3—3;

Fig. 4 is a transverse sectional view, taken on the line 4—4 of Fig. 3;

Fig. 5 is a similar view, taken on the line 5—5 of Fig. 3;

Fig. 6 is a detail view, partly in section and partly in elevation, of the right-hand end position of the structure shown in Fig. 2; and

Fig. 7 is a detail view, in side elevation, of that portion of the weigh-bridge structure adjacent to the abutting ends of aligned weigh-bridge sections.

Before proceeding with a description of the details of construction of the weigh-bridge assembly, it may be pointed out that it is becoming increasingly common to weigh cars in motion without stopping them on the weigh-bridge or scales.

This is usually done by mounting the weigh-bridge and rails on a grade, and allowing the rolling-stock to roll over the weigh-bridge by gravity. The grade may be anywhere between .8% and 3%. For this character of weighing it is essential that the top of the rail be straight and true to whatever grade is used, as irregularities in the rail will cause the rolling-stock to bounce or rock. With conventional scales so-called motion-weighing cannot be accomplished unless some means is provided for adjusting the rail-chairs to true up the rails and then pour type metal or the like between the bottom of the rail-chairs and the supporting girders to maintain the desired trueness. With the present invention the desired end result may be obtained notwithstanding that many of the heretofore used parts are dispensed with and the unit structure greatly simplified.

In the embodiment of the invention selected for illustration the track-scale is made up of two cast steel frames 10 adapted to be bolted together as at 11 to form a single weigh-bridge which is supported on six weighing cells—two at each end of each section. The length and number of frames however may be varied depending on the desired length of weigh-bridge, that is, it could be a single frame supported on four weighing cells, or three frames supported on eight cells. While cast steel frames are preferable, the frames can, of course, be made up of welded structural steel members, and accomplish the same purpose. Regardless of the number of frame sections employed, it is desirable, where the sections abut and are fastened together, that the abutting ends have a relatively shallow surface contact so that little, if any, resistance to bending occurs. In other words, provide at the section-ends what may be termed a semi-articulated joint so that each frame will act as an independent beam and not like a continuous beam over the multiple-section support. The reason for this is that it minimizes any tendency of the weigh-bridge to lift off the supports adjacent to the bay on which the load is applied.

The frame sections 10 are all alike except for machining details. Each consists essentially of two girders 13, a deck portion 14, suitable dirt and rain guards 15, cross-webbing 16, and supporting pads or columns 17, one at each end of the four corners of each frame. The girders 13 are preferably tapered so that the maximum depth and strength thereof is located at the center of the span of each section where the bending moment is a maximum. The deck portion 14 between the rail supporting pads 17 serves also as a rigid bracing means to carry any and all horizontal side loads, and the man-hole openings 18 formed in the deck serve not only to lighten the structure without destroying any of its rigidity, but also, as the name implies, to provide entrance and exit openings leading to and from the pit 19 over which the weigh-bridge is fitted.

To help stiffen the frame sections, grooves 20 are formed in the deck 14 and have seated therein the bases of the rails 21 which may be welded or otherwise held in place. Not only do such grooves 20 locate the rails 21, but in addition they insure perfect alignment of the rail-heads both vertically and horizontally. Such an arrangement has a further advantage in that the metal of the weigh-bridge is distributed properly i. e., close to the rails where the loads (in a weighing position) are applied, to form an ex-

ceedingly stiff and rigid structure, which assures that the rails will be straight and true i. e., an essential to so-called "motion weighing." Such a structure combines in one simple unit all of the various parts which go to make up an acceptable track-scale, and, in addition, admits of easy access to all parts of the pit. Man-hole covers 22, which are nothing more nor less than circular discs, flanged down at their edges, prevent rain and dirt from entering the pit. Moreover, as this type scale will undoubtedly be used on a grade, water cannot collect in the area between the rails since most, if not all, will drain off due to the grade.

Adjustable struts 23, bearing at one end on weighing cells 24 (strain gauge), and at their opposite ends on the supporting pads or abutments 17, support the entire weight of the weigh-bridge structure. Collectively the struts 23 providing a support for the weigh-bridge will allow of expansion or contraction of the latter due to temperature changes, without putting any appreciable side load on the cells. Note in this connection that the strut-ends are rounded as at 25. In addition, the weigh-bridge is held in place horizontally in the pit by flexure type horizontal checks 26 (two longitudinal and four transverse), which allow free movement of the weigh-bridge vertically and hold it rigid against horizontal movement. This type of check, which acts both in tension and compression, is more or less common to the better types of railroad scales.

As previously mentioned the width of the pit 19 can be reduced from the usual ten feet to a little under seven feet at the bottom, and taper to a little over five feet at the top. The ends of the pit can be located so that the pit is slightly longer than the live rails. This results in a simple rectangular pit with from four to eight piers 27 on which the scales rest. The size of the pit is largely governed by the required bearings 28 under the cells 24 which in the embodiment illustrated should be about sixteen inches square to properly distribute the load over the tops of the concrete piers.

Scales thus characterized require little or no servicing, other than an occasional replacement of a defective strain-gauge cell; are capable of accurately weighing the heaviest of rolling-stock without damage to the scales, whether "in motion" or standing still; require no so-called dead-rails onto which it has heretofore been customary to switch the heavier rolling-stock; and can be manufactured and sold at prices much lower than competing units.

While the invention has been described with respect to a certain and particular preferred example which, by test, has given eminently satisfactory results, it will be understood by those skilled in the art after understanding the invention, that various changes and modifications may be made without departing from the spirit and scope of the invention, and it is intended therefore in the annexed claims to cover all such changes and modifications.

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

1. In a railroad track-scale assembly; a weigh-bridge including a deck portion adapted to provide a cover for the pit within which the load-measuring instrumentalities of the track-scale are adapted to be housed, said deck portion having formed therein grooves within which the base-flanges of the live-rails of the weigh-bridge are adapted to be fitted and securely held.

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2. In a railroad track-scale assembly, a weigh-bridge including one or more frame sections of girder-like construction, each frame section including spaced side-members, a substantially horizontally flat top member extending from one to the other of said side members to provide a cover for the pit within which the weigh-bridge is adapted to be housed, and a plurality of transversely extending cross-brace members connected at their opposite ends to said side members, the components of each said frame section being movable as a unit structure upon the imposition of a load thereon in a weighing operation.

3. In a railroad track-scale assembly, a weigh-bridge including one or more frame sections of girder-like construction, each frame section including spaced side members, a substantially horizontally flat top member extending from one to the other of said side members, and a plurality of transversely extending cross-brace members connected at their opposite ends to said side members and along their upper edges to said top member, said substantially horizontally flat top member providing for the weigh-bridge a deck portion to which the live rails of the weigh-bridge assembly are fastened.

4. In a railroad track-scale assembly, a weigh-bridge including one or more substantially rectangular frame sections of girder-like construc-

tion, each frame section having formed integrally therewith and at each of its respective four corners an abutment member against which, in a weighing operation, the weighing load is applied, each frame section comprising, in addition to said abutment members, spaced side members, a substantially horizontally flat top member and a plurality of transversely extending cross-brace members, said top member being extended from one to the other of the side members, and said cross-brace members being joined at their upper edges to said top member and connected at their ends to said side members, and said top member providing for the weigh-bridge a substantially horizontally flat surface on which the live-rails of the weigh-bridge are adapted to be laid, as well as a cover for the pit within which the weigh-bridge is housed.

ARTHUR L. THURSTON.

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