

Dec. 14, 1965

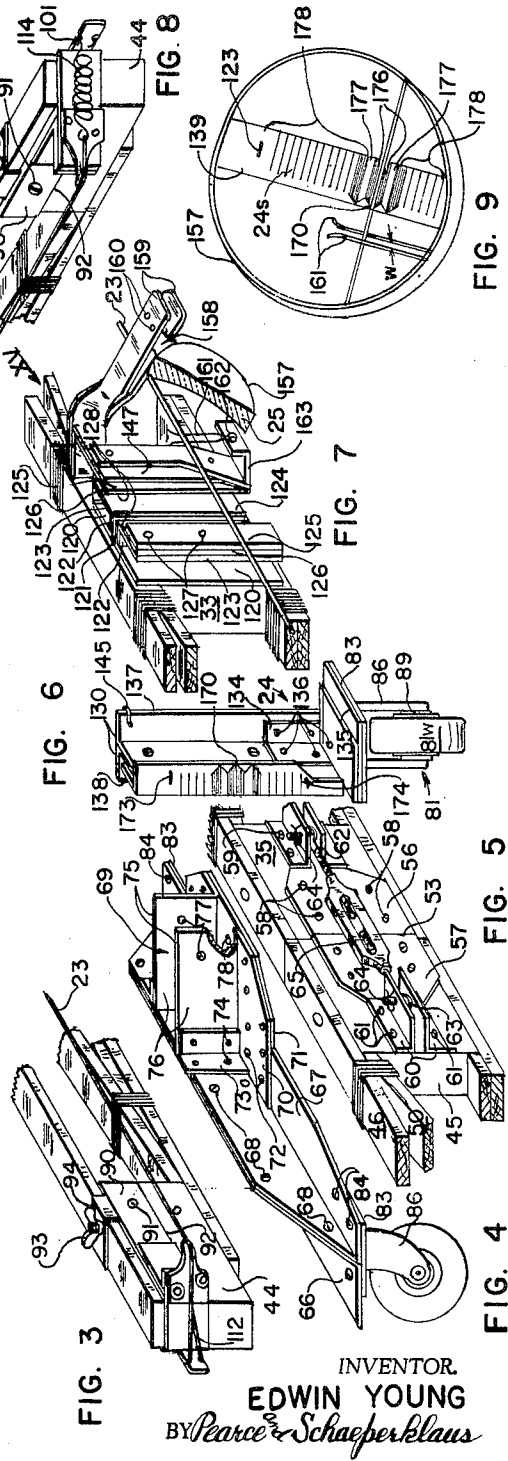
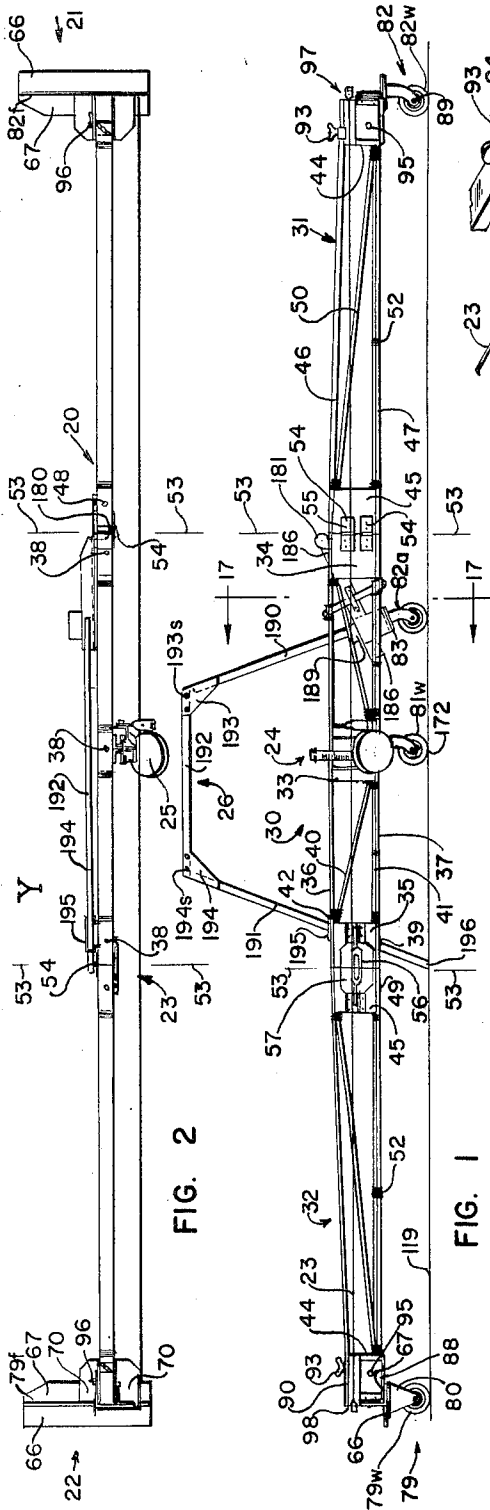
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3,222,787

ROAD GAUGE

Filed Oct. 31, 1962

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

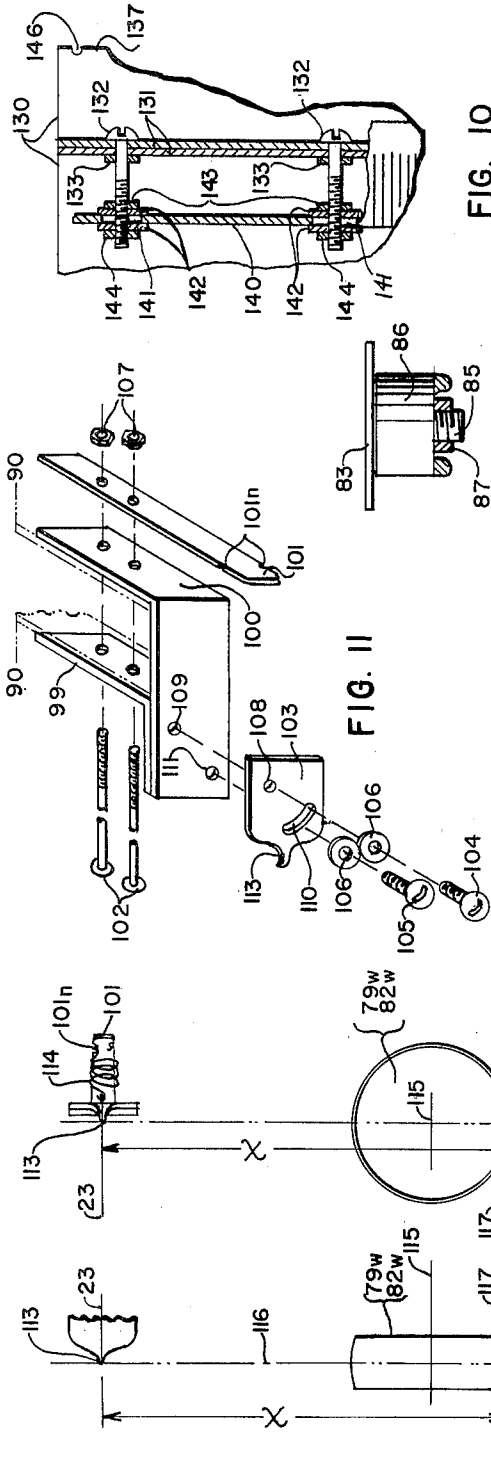


FIG. 10

FIG. 11

FIG. 13

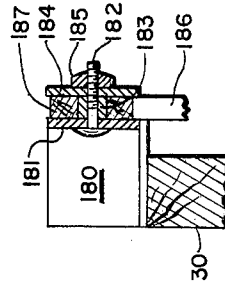
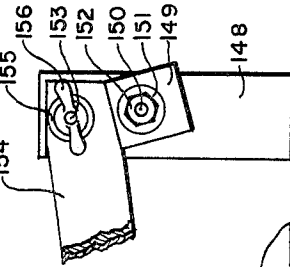


FIG. 16

FIG. 15

FIG. 18

FIG. 17

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ROAD GAUGE

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11 Claims. (Cl. 33—86)

This invention relates to road gauges for use in checking the surface of a road.

Streets and highways are customarily constructed in accordance with specifications which usually include provisions as to the dimensional tolerance limits for the surface of the highway upon which vehicular traffic runs. For example, the specifications and drawings would define the profile of the highway along its center line and additionally, for example, the specifications may provide that between any two points lying on a line parallel to the center line and ten feet distant from each other, no intervening point on the surface may be more than one-eighth inch above or below a straight line extending between those two points. This in effect is a measurement of the smoothness of the highway. In order to determine whether a highway has been built to the desired degree of flatness or smoothness specified, it has been the general practice in the past to make such determination through the efforts of a surveying crew equipped with suitable surveying instruments. Such a survey requires a very substantial amount of time and labor which in terms of cost is substantial. Further, a surveying crew can only check a limited amount of highway during a working day, and the accuracy of any such surveying is subject to introduction of human error in addition to any instrumental error.

An object of this invention is to provide a device which may be conveniently transported and operated by one person.

Another object of this invention is to provide a device of the foregoing character with which one person may check the surface of a highway for conformity with specifications of the character mentioned above.

Another object of this invention is to provide a device of the above character which may be used to check a road surface speedily and accurately at a substantial saving in time and labor.

Another object of this invention is to provide a device of the above character which is so constructed that it is light in weight, strong, rugged, easily transportable by one man from place to place, may be quickly placed in operative condition or in compact transportable condition by one man.

Another object of this invention is to provide a device of the above character which may be easily checked for correctness in the field at the time it is placed in operative condition or at any time when it is in operative condition, thereby avoiding waste of time through use of an erroneous instrument.

Another object of this invention is to provide a device of the above character which is constructed so as to substantially minimize the effect of any distortions, temporary or otherwise, of the frame or other portions of the device upon the readings obtained through its use.

Another object of this invention is to provide a device of the above character having a wheeled frame, a string-line supported at two points spaced a predetermined distance apart on the frame and each located above a frame wheel, vertical guide means on said frame intermediate said two points, a calibrated scale vertically slidable in said guide means adjacent said string-line and supported upon a subjacent surface engaging wheel.

Another object of this invention is to provide a device of the above character having a lightweight, strong,

frame comprising a plurality of sections adapted to be repeatedly secured in predetermined aligned relation to each other.

The above and other objects and features of this invention will in part be obvious and will in part be apparent to those having ordinary skill in the art to which this invention pertains, from the following detailed description and the drawings of the illustrative embodiment disclosed.

In the drawings:

FIG. 1 is a view in side elevation of what presently appears to be a preferred embodiment of my invention;

FIG. 2 is a top plan view of the device shown in FIG. 1;

FIG. 3 is a view in perspective of a fragment of the device of FIG. 1, showing details of construction of one end portion of the frame thereof;

FIG. 4 is a view in perspective of a portion of a wheel assembly;

FIG. 5 is a view in perspective of portions of elements of the frame in operative relation;

FIG. 6 is a view in perspective of a surface riding calibrated column;

FIG. 7 is a view in perspective, partly in section, of a fragmentary central portion of the device of FIG. 1 with which the structure of FIG. 6 cooperates;

FIG. 8 is a view in perspective, similar to FIG. 3, but showing details of construction of the end portion of the device remote from that shown in FIG. 3;

FIG. 9 is an illustrative view showing the operator's view of the indicating portions of the gauge which are read by the operator;

FIG. 10 is a fragmentary view of a portion of the structure shown in FIG. 6, portions thereof being broken away to more clearly show details of construction;

FIG. 11 is an exploded fragmentary view of a string supporting finger, the mounting bracket therefor, and the string finger, showing details of construction;

FIG. 12 is a fragmentary view in front elevation, partly in section, showing some details of caster wheel mechanism;

FIG. 13 is a schematic view in side elevation showing the relation of a string-line support to a wheel;

FIG. 14 is a schematic view in end elevation showing the relation of a string-line support to a wheel;

FIG. 15 is a fragmentary view in elevation of a portion of the structure shown in FIG. 7 viewed in the direction of arrow XV in FIG. 7;

FIG. 16 is a fragmentary view in section taken generally on a plane to the right of section line 17—17 and to the left of the plane 53—53 in FIG. 1;

FIG. 17 is a fragmentary view in section taken generally on the plane 17—17 in FIG. 1; and

FIG. 18 is a fragmentary top plan view of a portion of the structure shown in perspective view 7.

In the following detailed description and the drawing, like reference characters indicate like parts.

A device constructed in accordance with an embodiment of this invention is shown in FIGS. 1 and 2 and includes a frame 20 secured to front and rear carriages 21, 22 and supporting string-line 23 and floating scale 24 in cooperative indicating relation for viewing in a frame supported observation mirror 25 by an operator guiding and propelling the device through handle 26 grasped in his hand.

Frame 20 is preferably light in weight, stiff and strong, but need not be rigid, in fact, may have some flexibility. For example, I have found that many parts of the frame can be made from clear, straight grained, white pine lumber which has been impregnated with raw linseed oil and cured, while others may be of strong lightweight metal

alloys. Frame 20 may have three major portions, central portion 30 and two similar end portions 31, 32 as shown.

Central portion 30 has center spacing block 33 and end spacing blocks 34, 35 secured to and between upper stringer 36 and lower stringer 37 by any suitable securing means represented by screws 38 and anchors or nuts 39. Each of the diagonal braces 40 and lower braces 41 extends between block 33 and an end block, 34 or 35, as shown in FIG. 1. Braces 40 and 41 are secured in place by suitable means represented by windings 42.

Front and rear end portions 31, 32 are similar and the following description of front portion 31 is also applicable to rear portion 32 and like reference characters have been applied to corresponding parts of both.

Front end portion 31 has a carriage end spacing block 44 and a central end spacing block 45 secured between upper stringer 46 and lower stringer 47 by any suitable securing means represented by screws 48 and anchors or nuts 49. Diagonal brace 50 extends between blocks 44, 45 and stringers 46, 47 and is secured in place by suitable means represented by windings 52.

Each of the portions 31 and 32 are similarly so connected and secured to portion 30 as to be securable in aligned unitary frame forming relation thereto and releasable so that portions 31 and 32 may be swung into positions alongside portion 30.

The opposed end faces of portions 30 and 31 are preferably flat and oriented to abut in substantially face-to-face relation in plane 53 when portions 30 and 31 are in aligned relation as shown in FIGS. 1 and 2. With portions 30 and 31 clamped together in desired alignment, hinges 54 are positioned as shown in FIG. 1 and respective plates thereof are secured to front end spacing block 34 and central end spacing block 45 by suitable fastening means such as screws 55. In applying hinges 54 to frame portions with the pivot axis substantially in the plane 53 of the abutting end faces of portions 30 and 31, I prefer to remove any slack or play in the hinge 54 by urging the hinge plates of each hinge 54 away from each other. Hinges 54 are similarly applied to the rear side of frame portions 30, 31, as shown in FIG. 1 and to the opposite side of frame portions 30, 32, as shown in FIG. 2. Similar indexing stop or abutment plates 56 are respectively mounted on the end spacing blocks 34, 35 of portion 30, while similar abutment plates 57 are mounted upon central end spacing blocks 45 of portions 31, 32, each for indexing cooperative engagement in plane 53 with a respective abutment plate 56, as shown most clearly in FIG. 5. Plates 56, 57 are secured to the respective spacing blocks by any suitable means such as screws 58. Turnbuckle anchor brackets 59, 60 which may be separate from or integral with abutment plates 56, 57 are secured by suitable means such as screws 61, to respective spacing blocks adjacent the abutment plates. Eyebolts 62, 63 are respectively secured by pins 64 to anchor brackets 59, 60 and coupled by link-nut 65. Thus, when the frame 20 is to be unfolded and placed in the predetermined condition of alignment shown in FIGS. 1 and 2, the end portions 31, 32 are swung into substantial alignment with section 30. One eye of the turnbuckle being already pinned to its anchor, the second eye is then positioned in its anchor bracket and pinned in place. Thereafter, link-nut 65 is rotated to draw the adjacent abutment plates 56, 57 into indexing engagement.

The front and rear carriages of the illustrative embodiment shown in FIGS. 1, 2 and 4, are similar in construction. Front carriage 21 includes a transversely extending main structure of inverted T-shape in cross-section and comprising angle members 66, 67 secured together by suitable fasteners represented by machine screws 68. A pocket 69, for receiving an end portion of frame 20, is provided in a predetermined location spaced from the ends of the main structure by securing two angle members 70 to the horizontal flange of member 67 and to extension plate 71 by suitable means represented by screws 72 and

to the upright flanges of members 66, 67 by corner brackets 73 and suitable fastening means represented by screws 74. The straight upper edges 75 are provided on the parallel upright flanges 76 of members 70. A pair of aligned apertures 77 are provided in flanges 76 and a threaded aperture 78 in extension plate 71. The above described carriage structure is found in both the front and rear carriages. Front carriage 21 has a pair of caster wheels 82 while rear carriage 22 has a pair of rigid mount wheels 79.

Each caster wheel 82 has a mounting plate 83 secured to the underside of the main structure of the front carriage 66-67 in predetermined position adjacent a respective end thereof by suitable fastening means represented by screws 84. A vertical post 85 extends downwardly from plate 83 through the swivel fork 86 held on post 85 by retaining and adjusting nut 87. Suitable antifriction bearings (not shown) may be provided between fork 86 and plate 83 and also post 85 in order that fork 86 swivels freely about post 85 without any substantial cocking movement or longitudinal movement relative to plate 83 and post 85. The wheels 82w, preferably equipped with antifriction bearings, are journaled for rotation about axles 89 mounted in fork 86. Each rigid mount wheel 79 has a forked mounting plate 80 secured to the underside of the main structure of the rear carriage 66-67 in predetermined positions adjacent respective ends thereof by suitable fastening means represented by screws 88. The wheels 79w are preferably identical with wheels 82w, and each rotates on an axle 89 mounted in the fork arms of fork mounting plate 80.

Frame 20 is secured to the front carriage 21 by inserting part of the front portion 31, particularly parts of its lower stringer 47 and of the carriage end spacing block 44, into pocket 69 between upright flanges 76 and substantially in abutment with the upright flange of angle member 67, which closes one end of the pocket 69. A pair of abutment plates 90 are secured to opposite sides of the frame 20, by bolts 91 extending through block 44. Each abutment plate 90 has a lower edge 92 which cooperatively engages a respective edge 75 of an upright flange 76 of the carriage, to index the frame in relation to the carriage 21. Finger screw 93 extends through saddle plate 94, frame 20, the space between frame 20 and extension plate 71, and aperture 78 in extension plate 71 which is threaded, as previously mentioned, to cooperate with screw 93. Screw 93 is drawn up to secure the indexing abutment edges 75, 92 in tight face-to-face engagement. Clamp bolt 95 is then inserted through apertures 77 and the intervening portion of frame 20, into threaded engagement with wing nut 96, which is then drawn up to clamp the flanges 76 against the sides of block 44 of frame 20 and to preclude sliding movement of frame 20 and abutment plates 90 relative to abutting edges 75 of carriage 21. Since rear carriage 22 is secured to frame 20 in the same manner as is carriage 21, like reference characters have been applied to the corresponding parts.

Frame 20, front carriage 21 and rear carriage 22 may thus be assembled to form a wheeled frame for the gauge. A string-line 23 is mounted thereon by means of two string-line support assemblies 97, 98. Each assembly, as shown particularly in FIG. 11, includes two angle members 99, 100 which together form an F-shape bracket, a string-line anchor post 101 having notches 101n, mounting bolts 102, string-line locator plate 103, and locator plate securing screws 104, 105 with washers 106. Angle member 99 has one arm in face-to-face engagement with a portion of a face of an abutment plate 90 and spaced from the edge 92 thereof, while its second arm extends perpendicularly and coplanar with the end face of frame 20. Angle member 100 has its one arm overlying a second abutment plate 90 and between that plate and string-line anchor post 101. The other arm of member 100 overlies the end face of the frame and the second arm of angle member 99. Bolts 102 extend successively through angle

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member 99, plate 90, frame 20, plate 90, member 100, and post 101 into threaded engagement with nuts 107. Screw 104 extends successively through washer 106 and apertures 108 and 109 into threaded engagement with angle member 99 or a nut beyond it, not shown, to pivotally secure and locate locator plate 103. Screw 105 extends successively through washer 106, slot 110, aperture 111, into threaded engagement with angle member 99 or a nut beyond it, not shown. String-line locator plate 103 may be swung about screw 104 through an arc determined by screw 105 and slot 110 to a position as desired and then secured by tightening screws 104 and 105.

String-line 23 may be made from any suitable thread, cord or other like small cross-sectioned, non-kinking, lightweight, strong, durable material, for example, nylon thread, cable cord, fish line or the like. At the rear end of the frame 20, string-line 23 has a loop 112 (FIG. 3) encircling anchor post 101 and engaging notches 101*n* therein. From loop 112, string-line 23 lies in and extends through the outside groove in the curved finger portion 113 of locator plate 103 (rear end of frame 20), then to the locator plate 103 (front end of frame 20), in and along the outside groove in curved finger portion 113 thereof and then to tension spring 114 to which it is secured. Tension spring 114 is secured on anchor post 101 at the front end of frame 20 and maintains string 23 in a predetermined tension condition in which it is substantially straight. As shown in FIGS. 13 and 14, the tip of each finger 113 is located in a position a predetermined distance *x* above the surface 117 engaged by the wheel 79*w*, 82*w* and directly above the axis of wheel rotation 115, the center line of the wheel tread 116 and the center point 118 of wheel contact with flat surface 117. Thus, string-line 23 is substantially a straight reference line parallel to an imaginary straight line between the two points at which the near wheels 79*w* and 82*w* (in FIG. 1) respectively contact the surface 119 to be gauged, as viewed in FIG. 1. The far wheels 79*w* and 82*w* (behind those shown in FIG. 1 and located beneath the angle members 66, 67 of carriages 21, 22 in substantially the locations designated in FIG. 2 by reference characters 79*f* and 82*f*) serve as outrigger wheels and serve to maintain the center line of wheel tread 116 as extended to finger 113 (FIG. 14) in substantially perpendicular relation to surface 117. The frame 20 is sufficiently stiff that such flexing or vibration as it may undergo have no material effect upon string-line 23. A floating scale 24 is provided adjacent the center of string-line 23 and is supported in guide means secured to frame 20. The guide means in the illustrative embodiment shown in the drawings is a vertically extending T-track or T-way located between center spacing block 33 and string-line 23. A pair of angle members 120 are secured to block 33 by suitable fastening means such as bolts, not shown, to provide a double flange 121 between flanges 122 of angle members 123. Fastening means such as bolts, not shown, secure flanges 121 and 122 together; and a flat vertical way or track surface 124 is thus, by appropriate selection of flange dimensions and relative positions, provided in predetermined spaced relation to string-line 23. A pair of flanges 125 are provided, spaced from surface 124 by shims 126 and secured by screws 127 to define opposed slots 128.

Floating scale assembly 24 is shown in FIG. 6. The scale float has a column 130 of T-shape cross-section and consisting of two angle members having flanges 131 secured together by screws 132 and nuts 133. Column 130 is secured to corner bracket 134 which is also secured to column base 135 by suitable fasteners such as screws 136. Base 135 is secured to mounting plate 83 of caster wheel 81 identical with the caster wheels 82 of the front carriage 21, and the like parts thereof have been indicated by like reference characters, except the wheel thereof is referred to as 81*w*. Margins of column 130 adjacent flange edges 137, 138 (FIG. 6) are received in slots 128

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(FIG. 7) and are freely slidable therein with minimum play. A calibrated scale 24*s* is provided upon one flange of an angle member 139, flange 140 of which has vertical slots 141 (FIG. 10) through which screws 132 extend. Flange 140, between washers 142, is clamped in fixed relation to column 130 by nuts 143, 144, the former of which determine the spacing between flange 131 and flange 140, while the latter, 144, may be loosened for vertical repositioning of the scale in relation to string-line 23 and then tightened to secure it as repositioned. As shown in FIG. 1, column 130 extends above the frame carried guide therefore. A spring clip 145 (FIGS. 1 and 6) engages notches 146 (FIG. 10) in edges 137, 138 and precludes separation of column 130 from its guide, when, for example, the gauge is lifted to be carried.

An angle bracket 147 is secured to the column guide structure, as shown in FIG. 7, and provides a vertical flange face 148 (FIG. 15) substantially perpendicular to frame 20. An indexing abutment 149 is pivotally mounted upon threaded post 150 between washer 151 and face 148 against which it may be clamped by nut 152. A bolt or threaded post 153 also projects from face 148 in spaced relation to abutment 149. Mirror bracket 154 is pivotally mounted thereon between washer 155 and face 148. Wing nut 156 is provided for clamping bracket 154 against face 148 in cooperative engagement with abutment 149 which indexes the bracket to predetermined position.

A mirror 25, which, as shown in FIG. 7, may be a concave or magnifying mirror, is mounted in a frame or housing 157 having an arm 158 secured by clamping between the bifurcated portions 159 of bracket 154 which are drawn together by means such as screws 160. Mirror 25 is thus supported in a position in which an operator of the gauge in position Y of FIG. 2, may look downwardly into the mirror 25 and easily read the gauge while walking along with the gauge or standing beside it in the position Y (FIG. 2) behind the gauge as viewed in FIG. 1.

A fork 161 is mounted by screw 162 on a bracket 163 secured in fixed relation to a flange 125 of the column guide structure. The fork 161 transversely straddles string-line 23 adjacent floating scale 24 and has a width or interleg span *W* (FIG. 9), so as to limit horizontal vibration of string-line 23 without any substantial interference either with movement of the string-line toward or away from the crotch of the fork 161 or due to any vertical movement of the fork 161 relative to string-line 23. Fork 161 also precludes engagement of string-line 23 with the calibrated face of scale 24 upon which the former might otherwise drag or snag.

FIG. 9 is an operator's view of the string-line 23 in noncontacting but closely spaced relation to the calibrated scale 24. String-line 23 is shown in registry with the center or zero deviation mark 170 on scale 24, which mark 170 is positioned the same distance *x* (FIGS. 13, 14) above the center point 172 of contact of its related supporting wheel 81*w* with the surface 119, the point 172 corresponding to point 118 of FIGS. 13 and 14, as the string-line 23 (locator plate finger 113) is spaced above point 118. Scale 24 is substantially vertical, and coplanar with point 172 (FIG. 1). If the portion of surface 119 engaged by wheel 81*w* is below the imaginary straight line between the points of contact between that surface and wheels 79*w* and 82*w* beneath the ends of the span of string-line 23, the scale 24 will be supported in a lower relative position than shown in FIG. 9, the minus sign 123 at the top of the scale 24 will be nearer to string-line 23. Conversely, if wheel 81*w* rests on a point above the imaginary straight line mentioned, the scale 24 will be in a higher position relative to string-line 23 and minus sign 123 will be farther away from string-line 23 and plus sign 174 (FIG. 6) will be nearer to it. The calibrations of the scale 24 may be color coded as desired to facilitate correct reading of the gauge. For example, a

string width and string colored line may be provided at 170, and color bands contrasting with the string and arranged in symmetrical relation thereto such as 176 acceptable, 177 acceptable, but not to be exceeded, 178 unacceptable, too high or too low.

A bracket 180, mounted adjacent the forward end of frame portion 30, has a shoulder 181 annularly of horizontal shaft 182 oriented transversely of frame 20 as shown in FIG. 16. A spacing sleeve 183 is provided on shaft 182 between shoulder 181 and collar 184 and clamped therebetween by tightening of nut 185. A downwardly trailing arm 186 is adjacent its forward end 187, freely pivotable about sleeve 183 between shoulder 181 and collar 184, sleeve 183 being slightly longer than the thickness of the portion of arm 186 disposed between shoulder 181 and collar 184 spaced by sleeve 183. The rear end of arm 186 is secured to mounting plate 83 of a caster wheel 82a which is like the previously described caster wheel 82. Trailing arm 186 may be supplementarily supported in relation to frame 20 as shown in FIGS. 1 and 17. Brackets 165 and 166 are respectively secured by wrappings 42 to upper stringer 36 and to the lower stringer 37 with associated lower brace 41. A guide bar 167 is adjacent its ends secured to brackets 165 and 166 by means such as screws 168 and nuts 169. A strap 164 is secured to trailing arm 186 by bolts 171 and nuts 175 to define an elongate aperture 179 through which bar 167 extends to substantially preclude shifting of arm 186 in direction of arrows A or B (FIG. 17), but without substantial interference with normal pivoting of arm 186 about sleeve 183, though it does support the arm 186 against excessive downward movement as when the entire gauge is picked up and carried.

A handle 26 is pivotally secured to arm 186 adjacent caster wheel 82a by a pin 189 substantially parallel to shaft 182. Handle 26 has legs 190 and 191 coupled by fittings 193, 194 and grip 192. Fittings 193 and 194 are so constructed that removal of screw or bolt 193s or 194s renders the handle hingedly foldable. Leg 191 extends downwardly from fitting 194 through an elongate loop 195, which is secured to frame portion 30 near portion 32, and extends so that its lower end 196 engages the surface 119 as a gauge parking brake. When the gauge is to be read, it is always read in or the position at the conclusion of forward motion so the caster wheels 82w are related to the locator plate finger 113 as shown in FIGS. 13 and 14.

Forward operative movement of the gauge is effected by an operator in a position such as is indicated by Y in FIG. 2, tiltingly lifting grip portion 192 in his right hand so as to disengage the lower end 196 of leg 191 from the surface 119, with which it otherwise cooperates as brake means, and, thereafter, pushing the device forward. By turning or swinging grip 192 of the forwardly moving gauge, in a substantially horizontal fashion, the gauge may be turned as desired, however, the wheels 82w are, in normal operation, only turned a few degrees to the right or left, and the conditions of FIGS. 13 and 14 substantially obtain.

The gauge may be placed in convenient condition for carrying by folding handle 26, withdrawing leg 191 thereof from loop 195, removing mirror 25 by disengaging mirror bracket 154 from post 153, removing clip 145 and disengaging floating scale 24 from its T-way, and folding frame 20, as previously described. The gauge can be placed in operative condition by carrying out such operation in reverse.

The gauge may be easily checked for correctness by plucking string-line 23, the tone indicating the presence or absence of satisfactory tension and measurement from string-line 23, at the front and at the rear finger 113, to the flat, wheel-supporting-surface 119, and, also, from scale zero mark 170 to the flat surface 119 therebeneath. If such vertical distances are equal, the gauge is ready for use.

Having thus described what presently appears to be a preferred embodiment of my invention, it will be apparent to those having ordinary skill in the art to which this invention pertains that various modifications and changes may be made in the illustrative embodiment, without departing from the spirit or scope of the appended claims.

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

1. A pavement surface gauging device comprising in combination a rigid support means, an elongate thin line member extending spanwise between and supported at two spaced points by said rigid support means, said line member being above and substantially parallel to an imaginary straight line between two spaced points on a pavement surface and means supported at a point upon said surface between said two spaced points and beneath said line member in cooperative indicating relation to said line member, whereby the elevational relation to the imaginary line of the point supporting said second mentioned means may be determined.

2. A pavement surface gauging device comprising in combination a rigid support means, an elongate thin line member extending spanwise between and supported at two spaced points by said rigid support means, said spaced points each being equidistant from respective predetermined equally spaced points on a surface to be gauged, said line member being substantially parallel to an imaginary straight line between said points on said surface and means supported at a point upon said surface between said spaced surface points and in cooperative indicating relation to said line member, whereby the elevational relation to the imaginary line of the point supporting said second mentioned means may be determined.

3. A device for gauging the contour of a road or the like which comprises a rigid frame, spaced supports on said frame for engaging the road, spaced means on said frame for supporting opposite ends of a flexible line each at respective predetermined height above a road contacting portion of a respective one of the supports, guide means on the frame spaced between the supports and extending transversely of and adjacent the line, and a gauge mounted on said guide means and engageable with the road for indicating the height of the line above the road adjacent the guide means.

4. A device in accordance with claim 3 characterized by the fact that a mirror is supported by said frame for horizontal observation of the vertical position of the gauge relative to said string-line from a gauge operator's vantage point.

5. A device for gauging the contour of a road or the like which comprises a rigid frame, spaced wheel supports on said frame for engaging the road and supporting the frame, spaced means on said frame for supporting opposite ends of a flexible line each at respective predetermined height above a road contacting portion of a respective one of the supports, guide means on the frame spaced between the supports and extending transversely of and adjacent the line, and a gauge mounted on said guide means, said gauge including a wheel engageable with the road for supporting the gauge, the gauge indicating the height of the line above the road adjacent the guide means.

6. A pavement surface line contour gauging device comprising in combination an elongate lightweight substantially stiff frame, a pair of spaced string-line supporting means on said frame, a string-line supported by and spanning the space between said string-line supporting means, a plurality of pavement engaging wheels supporting said frame, one of said wheels being disposed beneath each one of said string-line supports and said string-line, said string-line being supported in parallel relation to an imaginary straight line extending between the points of said pavement surface contacted by said two wheels beneath said string-line supports and string-line, guide means supported on said frame intermediate its

ends and adjacent said string-line, a floating scale vertically slideable in said guide means adjacent and in cooperative indicating relation to said string-line and having a swivel caster wheel engaging the pavement surfaces therebeneath, and handle means for pushing and guiding said device along on said pavement surface.

7. A pavement surface line contour gauging device comprising in combination an elongate lightweight foldable frame secureable in stiff frame forming relation, a pair of spaced string-line supporting means on said frame, a string-line supported by and spanning the space between said string-line supporting means, a plurality of pavement engaging wheels supporting said frame adjacent its ends and being adjacent one end thereof swivelly mounted, one of said wheels being disposed beneath each one of said string-line supports and said string-line, said string-line being supported in parallel relation to an imaginary straight line extending between the points of said pavement surface contacted by said two wheels beneath said string-line supports and string-line, guide means supported on said frame intermediate its ends and adjacent said string-line, a floating scale vertically slideable in said guide means adjacent and in cooperative indicating relation to said string-line and having a swivel caster wheel engaging the pavement surface therebeneath, and handle means for pushing and guiding said device along on said pavement surface.

8. A pavement surface line contour gauging device comprising in combination an elongate lightweight substantially straight frame, a pair of spaced string-line supporting means on said frame, a string-line supported by and spanning the space between said string-line supporting means, a plurality of pavement engaging wheels supporting said frame, one of said wheels being disposed beneath each one of said string-line supports and said string-line, said string-line being supported in parallel relation to an imaginary straight line extending between the points of said pavement surface contacted by said two wheels beneath said string-line supports and string-line, guide means supported on said frame intermediate its ends and adjacent said string-line, a floating scale vertically slideable in said guide means adjacent and in cooperative indicating relation to said string-line and having a swivel caster wheel engaging the pavement surface therebeneath, and handle means for pushing and guiding said device along on said pavement surface, said handle means comprising an arm pivotally coupled adjacent one of its ends to said frame, a supporting caster wheel adjacent the other end of said arm, a handle pivotally secured to said arm adjacent said caster wheel and extending upwardly, rearwardly, and downwardly, the rear end of said handle being adapted to engage the pavement surface to preclude undesired movement of the gauge.

9. A pavement surface line contour gauging device comprising in combination an elongate lightweight substantially straight frame, a pair of spaced string-line supporting means on said frame, a string-line supported by and spanning the space between said string-line supporting means, a plurality of pavement engaging wheels supporting said frame, one of said wheels being disposed beneath each one of said string-line supports and said string-line, said string-line being supported in parallel relation to an imaginary straight line extending between the points of said pavement surface contacted by said two wheels beneath said string-line supports and string-line, guide

means supported on said frame intermediate its ends and adjacent said string-line, a floating scale vertically slideable in said guide means adjacent and in cooperative indicating relation to said string-line and having a swivel caster wheel engaging the pavement surface therebeneath, and handle means for pushing and guiding said device along on said pavement surface, said handle means comprises an arm pivotally coupled adjacent one of its ends to said frame and having brake means for engaging the pavement surface when said device is parked and disengaged from the pavement surface when said handle is moved to a position in which it is utilized by an operator to operate the gauging device.

10. A pavement surface line contour gauging device comprising in combination an elongate lightweight substantially rigid frame, a pair of spaced string-line supporting means on said frame, a string-line supported by and spanning the space between said string-line supporting means, a plurality of pavement engaging wheels supporting said frame, one of said wheels being disposed beneath each one of said string-line supports and said string-line, said string-line being supported in parallel relation to an imaginary straight line extending between the points of said pavement surface contacted by said two wheels beneath said string-line supports and string-line, guide means supported on said frame intermediate its ends and adjacent said string-line, a floating scale vertically slideable in said guide means adjacent and in cooperative indicating relation to said string-line and having a swivel caster wheel engaging the pavement surface therebeneath, and handle means for pushing and guiding said device along on said pavement surface.

11. A pavement surface line contour gauging device comprising in combination an elongate lightweight foldable frame secureable in stiff frame forming relation, a pair of spaced string-line supporting means on said frame, a string-line supported by and spanning the space between said string-line supporting means, a plurality of pavement engaging wheels supporting said frame adjacent its ends and being adjacent one end thereof swivelly mounted, one of said wheels being disposed beneath each one of said string-line supports and said string-line, said string-line being supported in parallel relation to an imaginary straight line extending between the points of said pavement surface contacted by said two wheels beneath said string-line supports and string-line, guide means supported on said frame intermediate its ends and adjacent said string-line, a floating scale vertically slideable in said guide means adjacent and in cooperative indicating relation to said string-line and having a swivel caster wheel engaging the pavement surface therebeneath, and handle means for pushing and guiding said device along on said pavement surface.

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