(No Model.) 2 Sheets—Sheet 1.

E. G. HARRISON & O. B. THOMPSON.

AXLE GAGE.

No. 454,002. Patented June 9, 1891.

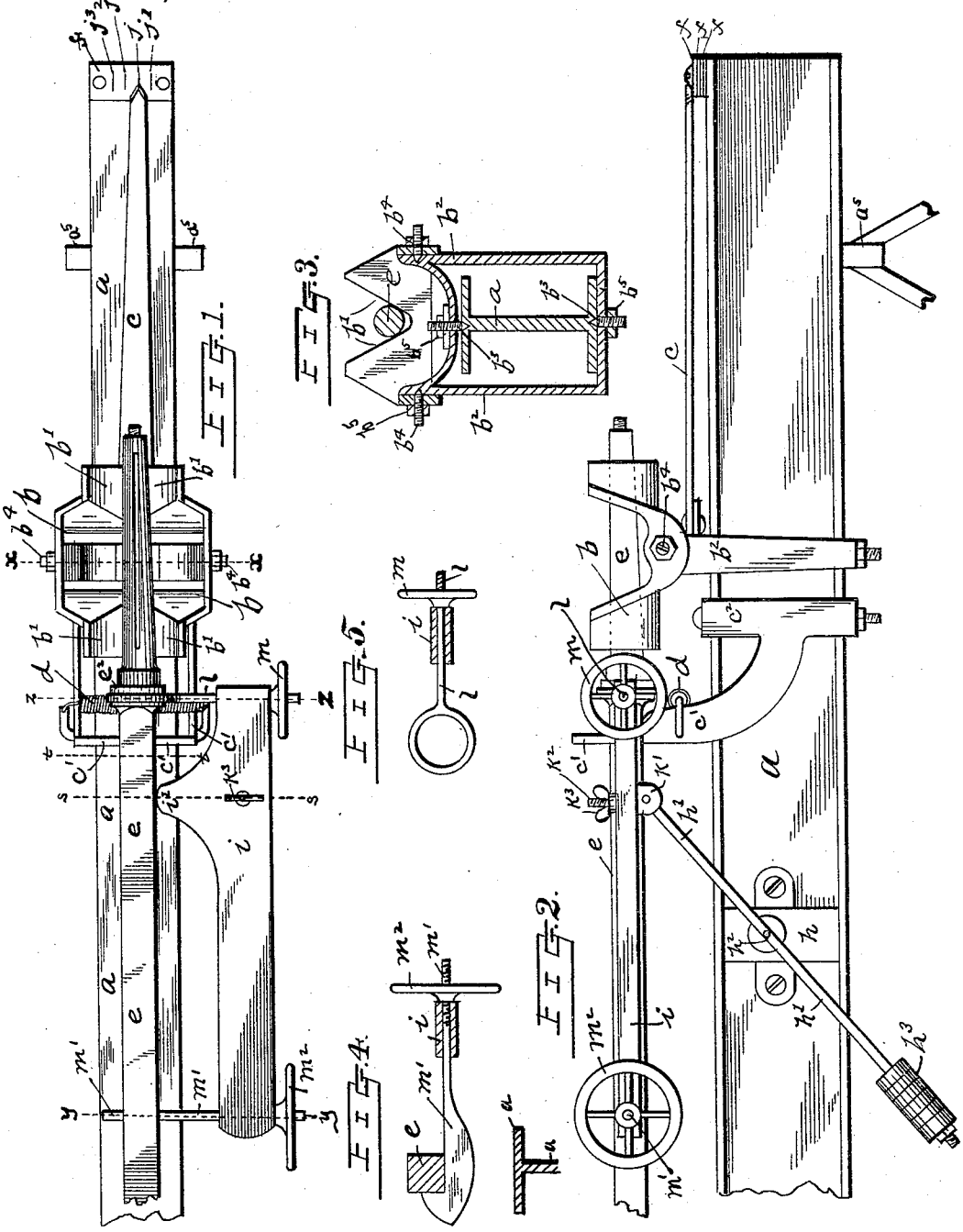

FIG. 1.

FIG. 3.

FIG. 5.

FIG. 4.

FIG. 2.

WITNESSES:

J. H. Travel.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 6.

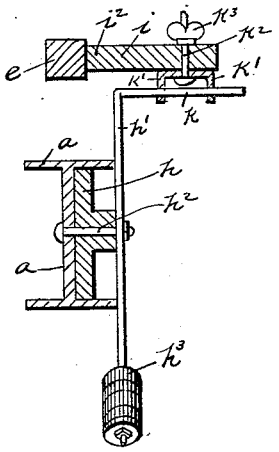


Fig. 7.

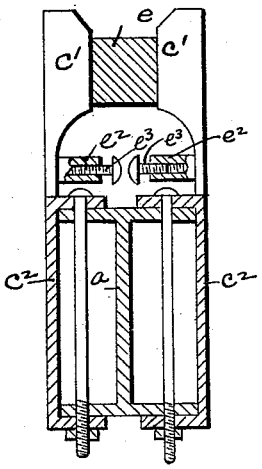


Fig. 8.

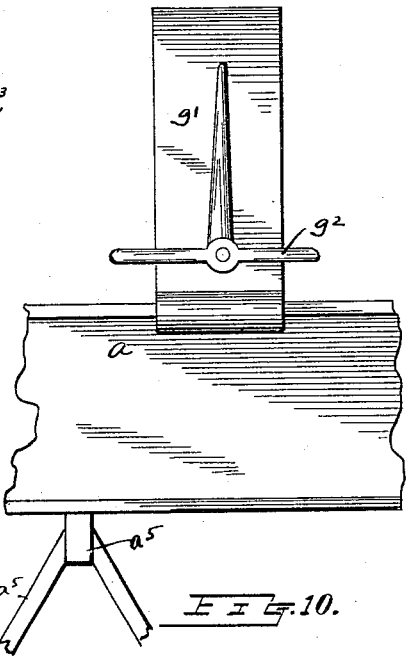


Fig. 9.

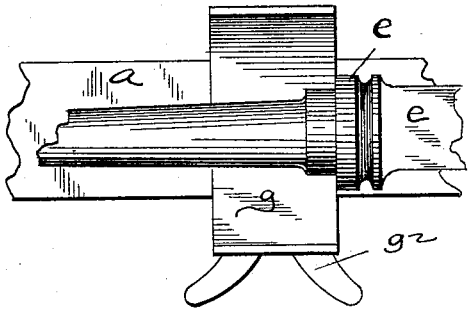
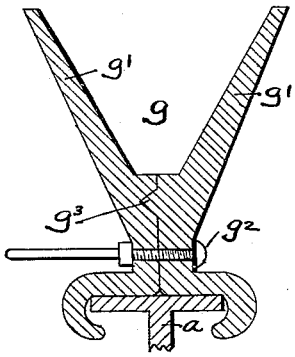


Fig. 10.



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UNITED STATES PATENT OFFICE.

EDWIN G. HARRISON AND ORRIN B. THOMPSON, OF JERSEY, OHIO; SAID HARRISON ASSIGNOR TO SAID THOMPSON.

AXLE-GAGE.

SPECIFICATION forming part of Letters Patent No. 454,002, dated June 9, 1891.

Application filed June 28, 1890. Serial No. 357,143. (No model.)

To all whom it may concern:

Be it known that we, EDWIN G. HARRISON and ORRIN B. THOMPSON, citizens of the United States, residing at Jersey, in the county of Licking and State of Ohio, have invented a certain new and useful Improvement in Axle-Gages, of which the following is a specification.

Our invention relates to axle-gages; and the objects of our invention are to produce an improved axle-gage, by means of which the proper set or swing and the gather of an axle may be accurately determined; to so construct and arrange the axle rests or guides as to automatically hold the latter in proper alignment; to combine with our improved gaging device superior means for bending the axle; to so construct our improved gage as to admit of its being supported upon a suitable trestle and to admit of applying the axle to the gage instead of the gage to the axle, as is commonly done, and to construct said device in such form as to insure accuracy and rapid operation. These objects we accomplish in the manner illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of the forward portion of our improved device. Fig. 2 is a side elevation of the same. Fig. 3 is a sectional view on line *x x* of Fig. 1. Fig. 4 is a transverse section on line *y y* of Fig. 1. Fig. 5 is a sectional view on line *z z* of Fig. 1. Fig. 6 is a transverse section on line *s s* of Fig. 1. Fig. 7 is a transverse section on line *t t* of Fig. 1. Fig. 8 is a side elevation of the rear axle-rest and a portion of the base-bar. Fig. 9 is a plan view of the same, and Fig. 10 is a transverse section of the same.

Similar letters refer to similar parts throughout the several views.

a represents the gage-base or supporting-bar, which, as shown, has its upper and lower sides flanged outwardly in the form of an **I**-beam, said base being preferably formed of metal and attached to a suitable trestle a^5.

b represents the forward spindle-supporting bracket, which is of an approximately-quadrilateral form. The upwardly-projecting forward and rear sides or ends of this bracket are provided, as shown, with oppositely-located **V**-shaped notches *b'*.

b^2 represents a vertical clevis or swivel frame, which loosely embraces the four sides of the base-bar *a*, and which has its upper and lower side pivotally connected with the upper and lower sides of the base-bar *a* in the forward portion thereof by cone-pointed set-screws b^3, which are held to the desired adjustment by jam-nuts b^5. The vertical sides of the swivel-frame are each provided with short upward extensions, as shown, to which are pivotally connected, by means of conical pivots b^4, the sides of the bracket *b*. The upper pivot-pin b^3 also serves to form a central connection of the swivel-frame top with the rear end of a forwardly-extending pointer *c*.

Located in the rear of the bracket *b* is a spring-actuated axle-clamp, which consists, as shown, of two jaws or arms *c'*, the heads of which extend upwardly above and on opposite sides of the center of the width of the base-bar, and are adapted to clamp, as hereinafter described, the square portion of the axle *e* in close proximity to the spindle-shoulder. Each of the jaw-arms *c'* extends rearwardly, and thence upwardly from the center of a vertical clip c^2, which is formed therewith, and which has its inturned ends pivotally connected with the upper and lower sides of the base-bar a short distance from the swivel-frame side arms. Projecting inwardly from the inner side of each of the jaws *c'* above the base-bar is an internally-screw-threaded tube or socket-piece e^2. The inner end of each of these socket-pieces receives, as shown, a screw-threaded pin or bolt e^3. The jaw-arms are connected in front of said tubular projections by a coiled spring *d*, the tension of which operates to draw toward each other said jaw-arms. The heads of the pins e^3 are adapted to meet and limit the inward movement of the jaw-arms when the axle is not clamped between said arms.

f represents index-plates, which are detachably secured one above the other upon the upper side of the base-bar beneath the pointer end.

g represents an axle-rest, which is designed, as hereinafter described, to receive and support in central alignment with the bracket *b* that end of the axle which is not being bent or adjusted, and which, for convenience, we

will call the "rear end." This support g is approximately Y-shaped in form, and consists of two half-Y-shaped sections g', which adjoin each other at their stem. The lower end of each of these sections g' is provided with an outwardly and thence inwardly bent flange, with hooks or clamps beneath the top flange of the base-bar. A bolt g^2 connects the stems of the clamping-sections g', said bolt passing loosely therethrough and having in its outer projecting screw-threaded end a suitable clamp or thumb nut, which is adapted to be turned against the stem of the rest and thus firmly unite the two sections. A further connection or joint between the sections g' is formed by forming on the side of one of said sections a conical projection g^3, said projection entering a correspondingly-shaped seat or socket in the remaining rest-section.

h represents a bearing-plate, which, as shown, is secured to the outer face of the base-bar between its flanges at a point in rear of the jaw-arm c'.

h' represents a flat bar pivoted at about its center to the plate h by means of a suitable bolt or pin h^2. The lower end of this bar h' is provided with a counterpoise or weight h^3, as shown, for the purpose of counterbalancing that portion of my device which is supported by the upper end of the plate h', as hereinafter described. The upper portion of this bar h' terminates in an outwardly-extending rounded arm k, which extends at right-angles with the body of the bar.

i represents a lever arm or bar, which is fulcrumed at a point in its forward half upon the horizontal upper portion of the bar h'. This connection of the lever and bar is formed by causing the said horizontal portion of the bar h' to pass loosely through the downwardly-extending fingers of a bearing-plate k', upon which rests or bears said lever-bar. A pivotal connection is formed between the lever-bar and bearing-piece k' by means of a pivot-bolt k^2. Upon the upper screw-threaded end of this bolt is secured a thumb or clamping nut k^3. The lever i has its forward end connected with the axle, which, as hereinafter described, is supported in the bracket b by means of a threaded rod l, which passes transversely through the forward end of the lever-bar and has its inner ring-shaped end encircling the shoulder of the axle-spindle, as shown. A hand-wheel m is screwed upon the outer projecting end of the rod l. The opposite end of the lever is similarly provided with a transverse threaded hook-rod m', the hook-shaped end of which is adapted to be made to engage with the opposite side of the axle-body when the latter is supported upon the gage. A hand-wheel m^2, corresponding with the wheel m, is screwed upon the outer projecting end of the rod m'. It is obvious that the rods l and m' may be provided with either hooks or rings, as desired. The lever is also provided opposite its fulcrum-point with a laterally-projecting lug or extension i^2, which, as shown, is adapted to bear against the axle.

The manner of operating my improved axle-gage is as follows: The axle to be set or gathered is, as shown, so placed that its forward spindle passes through the ring of the rod l and rests within the bracket b, while the rear spindle is supported within the rear rest g. That portion of the axle immediately in the rear of the spindle-shoulder e^2 is, as hereinbefore mentioned, clamped between the spring-actuated jaws c'. Upon the upper face of the top index-plate f is produced at proper intervals marks or indentations which have been found to be the points at which the pointer c will rest when the axle has been sufficiently bent to gain the desired "set" or "gather." For illustration we will suppose that the axle is so supported that its upper side is up, as shown in Fig. 1 of the drawings, and that it is desired to determine the bend or angle of the axle, which will result in the forward portions of the wheels being gathered toward each other, in order that the bearing of the hub may be against the spindle-shoulder.

In case the pointer is, as shown in the drawings, resting at the mark indicated by the letter j on the plate f, it will be evident to the operator that the axle has been provided with sufficient bend to attain the desired gather. If the pointer does not rest at the mark j, such additional bend is given to the axle, in the manner hereinafter described, as will bring the pointer through the movements of the supporting-bracket to the said mark. By giving the axle a quarter-turn in the bracket or rest an indication is given by the pointer of the degree of downward bend of the axle required to attain the set or swing thereof, which bend, as is well known, is for the purpose of producing a plumb spoke in a dished wheel. As previously determined, the proper degree of this latter bend is indicated when the pointer is at the mark lettered j'. The set and gather bends of one end of the axle having been determined in the manner above described, the position of the axle is reversed—that is, turned end for end.

The manner of attaining the desired bend for the set and gather of the axle end, which heretofore we have termed the "rear end" is the same as that prescribed for the forward end, except that the pointer, when the desired gather-bend is indicated, rests at the mark j^2, and when the desired set-bend is indicated the pointer indicates the mark j^3.

The variations in the positions of the pointer are the result of the positions assumed by the bracket b through its movements upon its conical pivots b^3, the position of said bracket being governed by the angle or bend of the spindle. Owing to their pivotal connection with the base-bar, the clamping-jaws c' are capable of such lateral movement as to cause them to conform to any arch or curve of the body of the axle and hold the axle plumb

without interfering with the movement of the bracket. Owing to the lateral pivotal connection of the bracket b with the arms of the clevis b^2 the bracket-head will accommodate itself to any taper of the spindle without interfering with or affecting the movement of the pointer. The axle to be bent having been placed as described in the gage and found not properly set or bent, the described bend may be given the axle by first turning the wheel m until the lever projection i^2 bears against the side of the axle, and then turning the hand-wheel m^2 until a pressure is given the axle, which will result in a sufficient bend of the latter at the point of contact of the projection i^2 and the axle to bring the points to the proper mark. It is obvious that this pressure may be applied to either side of the axle by turning the latter in its bearings. In order to facilitate the insertion of the forward spindle through the ring of the rod l, as above described, it is desirable to have the said ring-rod elevated slightly above its normal position. This is accomplished by moving forward the lower weighted end of the pivoted bar h', which will result in the upward movement of the forward end of the lever-bar. The weight at the bar end will operate as a counterpoise to balance the weight of the lever and its connected parts, and thus hold the lever in said elevated position.

From the construction shown and described it will be seen that the axle is supported by the gage. This obviates the necessity of more than one person being employed in securing the set and gather of the axle, as is necessary when the gage is applied to the axle, as is commonly done.

Having now fully described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In an axle-gage, the combination, with a base-bar a, of an axle-supporting bracket pivotally supported upon said base-bar, and a pointer or indicator connected with said bracket, substantially as set forth.

2. In an axle-gage, the combination, with a base-bar a, of an axle-supporting bracket pivotally connected with said base-bar by a conical pivot b^3, and provided with oppositely-located receiving notches b', and a pointer or indicator hand c, connected with said bracket, substantially as described.

3. In an axle-gage, the combination, with a base-bar a, of an axle-supporting bracket pivoted upon said bar, a pointer or indicator connected with said bracket, a swivel-frame b^2, pivoted, as described, to the base-bar, the notched bracket pivoted to said frame b^2, and a suitable support at the rear end portion of said base-bar, substantially as described.

4. In an axle-gage, the combination, with the base-bar, of an axle-supporting bracket b, pivoted thereto, and clamping-jaw arms c', pivotally connected with said base-bar and adapted to embrace, as described, opposite sides of an axle, substantially as specified.

5. In an axle-gage, the combination, with the base-bar, of an axle-supporting bracket b, pivoted thereon, and a rear rest g, consisting of half-**Y**-shaped sections g', a bolt g^2, connecting said sections, and clamping-fingers formed on the lower ends of said sections and engaging, as described, with the base-bar flange, substantially as specified.

6. In an axle-gage, the combination, with the base-bar, a pivoted axle-supporting bracket thereon, and a suitable rear axle rest or support, of a lever i, fulcrumed adjacent to the axle and adapted to bend the same by pressure to attain the set and gather of the axle, substantially as described.

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ORRIN B. THOMPSON.

In presence of—
EDWARD C. WILLIAMS,
FRANK E. HARRISON.