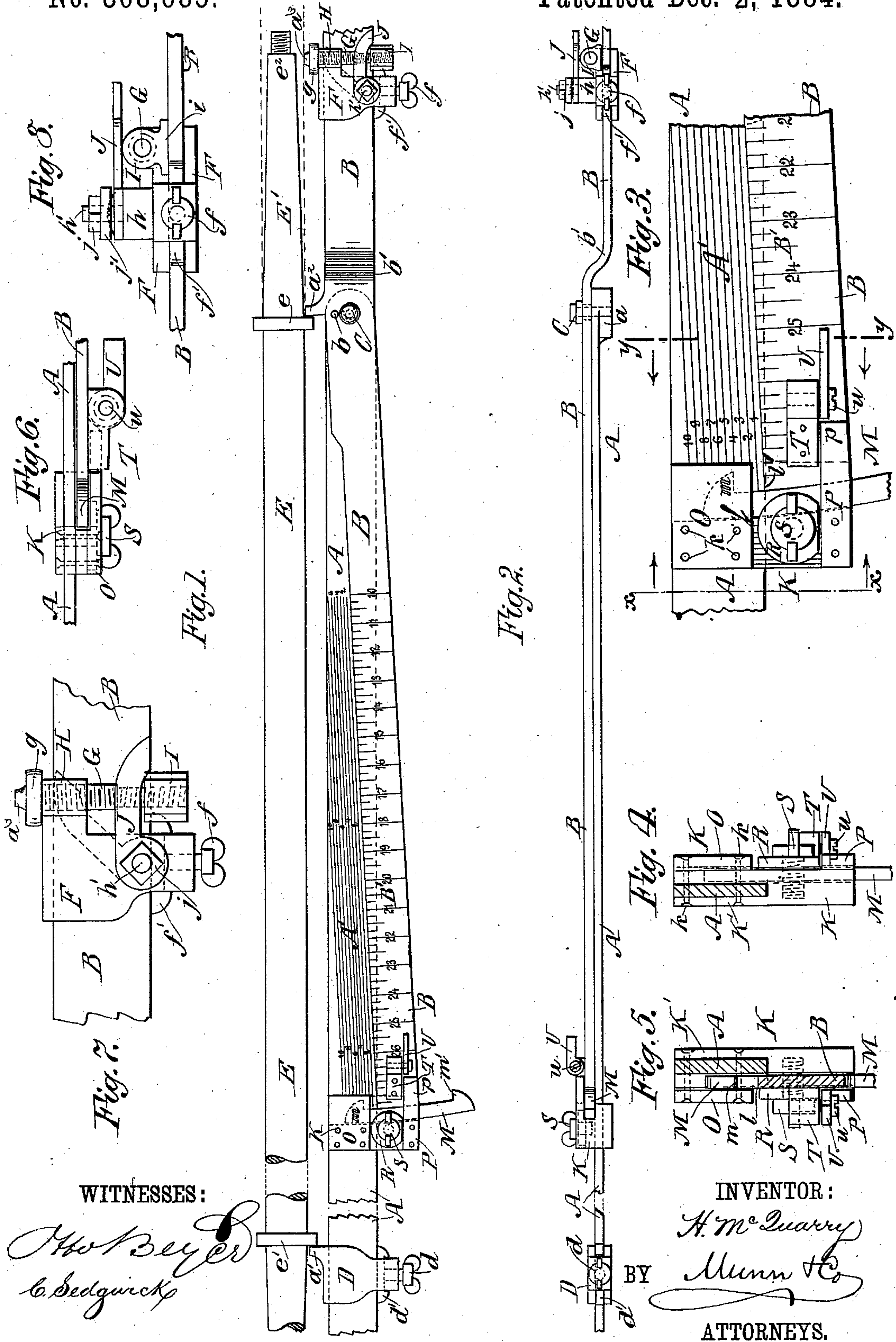


(No Model.)

H. McQUARRY.
AXLE GAGE.

No. 308,685.

Patented Dec. 2, 1884.



WITNESSES:

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AXLE-GAGE.

SPECIFICATION forming part of Letters Patent No. 308,685, dated December 2, 1884.

Application filed June 23, 1884. (No model.)

To all whom it may concern:

Be it known that I, HECTOR McQUARRY, of Allandale, in the Province of Ontario and Dominion of Canada, have invented a new and Improved Axle-Gage, of which the following is a full, clear, and exact description.

My invention relates to that class of gages used in bending the arms of vehicle-axes downward to give the proper "set" to the axles to cause the wheels to travel on a plumb spoke, and forward to give the proper "gather" to the wheels; and the object of the invention is to provide a simple, readily-adjustable, and reliable tool for this purpose.

The invention consists in various constructions and combinations of parts of the axle-gage, all as hereinafter fully described and claimed.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a face view, partly broken away, of my improved axle-gage as applied to an axle. Fig. 2 is a back edge view of the gage. Fig. 3 is an enlarged face view of the inner end of the radius-bar and its connections to the main bar of the gage. Fig. 4 is a cross-sectional view on the line $x x$, Fig. 3, and looking in the direction indicated by the arrows. Fig. 5 is a cross-sectional view on the line $y y$, Fig. 3, looking toward the left. Fig. 6 is an enlarged back edge view at the inner end of the radius-bar. Fig. 7 is an enlarged face view of the outer or gaging head of the radius-bar, and Fig. 8 is an edge view thereof.

The letter A indicates the main bar of the gage, which I prefer to make of a metal plate about two inches wide, three sixteenths of an inch thick, and about five feet long. At the outer end of bar A, I make it thicker by welding on a boss, a , so as to give substantial hold to the pin b , by which the radius-bar B is pivoted to the bar A, and also to the set-screw C, by which the radius-bar B is held flat against the face of the bar A. The hole in the bar B, through which the screw C passes, is sufficiently larger than the screw to allow the necessary play of the radius-bar on its pivot b , as hereinafter more fully explained.

Beyond the boss a of bar A the radius-bar

B is bent downward flatwise, as at b' , and extends lengthwise from the pivot-pin b for about ten inches.

D is a head fitted on the main bar A, so as to be shifted along the bar and to any required place to bring the gage point or stud a' on the front of the head against the collar e' on the axle E, as in Fig. 1. A set-screw, d , threaded into the back of the head D, presses the key d' onto the bar A to bind the head firmly to the bar. A gage point or stud, a'' , is fixed on the front edge of the radius-bar B, and the face of the stud which rests against the outer face of the collar e of the axle E is about in line with the center of the pivot-pin b of the radius-bar. At its outer end the radius-bar carries a head, F, which may be shifted along the bar and set to bring the gage-point a^3 of the head opposite the extreme end e^2 of the arm E' of the axle which is to be set. A set-screw, f , threaded into the back of the head F presses the key f' onto the bar B to hold the head immovably to the bar. I form the gage-point a^3 on the end of a screw, G, which is fitted by right-hand threads cut on its larger portion just inside of its edge milled head g into a boss or nut, H, fixed to the head F. The back end of the screw G is reduced in size and is fitted by left-hand threads into a movable nut, I, which has a flat side, i , bearing on the face of the radius-bar B, so as not to be turned with the screw, but to move along the screw.

J is a gage-arm, which I screw down on top of a boss, h , fixed on the head F by a nut, j , and spring-washer j' , which hold the arm quite firmly to the boss, but permit it to be swung on the screw-pin h' , which enters the boss h , and on which pin the arm J, nut j , and spring-washer j' are placed.

K is a fixed head, secured by screws or rivets k to the main bar A a little inside of the inner end of the radius-bar B, so that room is left between the end of bar B and the curved shoulder l of the head for the gib or key M, the shoulder l , gib M, and the inner end of the bar B being curved in the arcs of circles struck from the pivot-pin C as a center. The main body portion K' of the head K is slotted to receive the bar A, and the top face of its body portion is about level with the top faces

of the radius-bar B and gib M. Face-plates O P are fixed upon the head K so as to overhang the gib and radius-bar, respectively, and between these plates O P a trued washer, R, is placed, so as to be forced down upon the gib M by a set-screw, S, passed through the washer and threaded into the head K to bind the gib at any point where it may be set. The gib M has a shoulder, m , which is its gage-shoulder and is set in proper position for the front edge, l' , of the radius-bar to stop against it, and the gib has or may have an opposite end shoulder, m' , which strikes the back edge of the radius-bar to prevent the gib from slipping forward out of the head when the screw S is loose, the gib-shoulder m then serving also to prevent escape of the gib endwise the other way.

T is a stud or stop-piece which is fixed to the face of the radius-bar B, and acts to limit the backward movement of that end of the bar by contact with the elongated end p of the plate P, and a plate, U, is hinged by a screw-pin, u , to the back edge of the stud T, so that it may be thrown outward, as shown, or inward to come between the stop T and the end p of the plate P. The face of the radius-bar B is graduated, as at B', like a common rule, into inches and fractions thereof, from the pivot-pin C as a starting-point, for a length of twenty-eight inches, more or less; but the graduations need commence at a point about ten inches or more from the pin C, as shown. These graduations B' of the radius-bar indicate the length of the spoke, and I call them the "spoke-rule" of the gage. When the screw G is turned in until its head g strikes the head F, or as far as it will go, and when the extreme ends of the gage-points a' a^2 a^3 , which touch the side of the axle, are in line with each other, and when the edge of the fixed stop T rests against the arm p of the head K, a line is drawn on or marked into the face of the main bar A along the front edge of the radius-bar B, which I term the "base line," the points a' a^2 a^3 of the gage then being in line and the point a^3 in normal position, or so as not to indicate the set or gather of the axle-arm, as in Fig. 1. A series of lines then are drawn along a straight edge on the face of the bar A, and parallel with the base-line, and one-eighth of an inch apart, and numbered consecutively, the line next the base-line being marked 1, the next line 2, and so on, as clearly shown in Fig. 3. These lines or graduations A' on the bar A indicate the "dish" of the wheel-spoke, and I call them the "dish-rule" of the gage. The bend of the radius-bar B at b' brings the gage-point a^3 about in line flatwise of the gage with the point a' , and point a^2 is bent back to line with the points a' a^3 , so that the ends of all three gage-points would rest on a line drawn through the longitudinal center of the axle.

The operation is as follows: The head D is shifted on the bar A, and set by the screw d , so that its point a' will come outside of the axle-collar e' and the point a^2 outside of the

collar e , next to the arm E' of the axle which is to be set. The head F will now be shifted and set by the screw f and the gage-point a^3 directly opposite the extreme end e^2 of the axle-arm, said point a^3 being back as far as it will go, all as shown in Fig. 1. The diameter of the axle-arm E' just outside the collar e , or opposite the point a^2 , now is taken by a pair of ordinary outside calipers, and one point of the calipers then is placed against the outer or back end of the nut I, and the arm J is swung forward on its pivot h' until the forward edge of the arm at the center line of the screw G will touch the opposite point of the calipers. The size of the axle-arm at the end e^2 then is taken by the calipers, one point of which then is set against the forward edge of the arm J, and the screw G then is turned out or forward until the back end of the nut I registers fairly with the opposite point of the calipers. The pitch of the reverse threads of the screw G being alike, it is evident that as the nut I is carried forward the whole amount of the taper of the axle-arm the point a^3 will move forward but half that distance, or the exact amount of the true taper at one side of the axle-arm; or, in other words, the gage-point a^3 would be moved out to just touch the axle-arm at the end e^2 were the axle welded perfectly straight and true, which rarely occurs; hence the necessity of getting the true taper of the axle-arm without setting the gage-point a^3 to the end of the arm. We will now suppose that the spokes of the wheel which is to run on the axle have a length of twenty-four inches, and are "dished" five-eighths of an inch, the radius-bar B is swung on its pivot b until the twenty-four-inch mark on it touches or coincides with the line marked five on the bar A, the gib M is now moved until its forward shoulder m rests firmly against the forward edge of the radius-bar at l' , and the screw S is tightened to bind the gib fast in the head K.

It will be understood that in laying out the base-line of the dish-rule on the bar A by the radius-bar B the back edge of the stop T rested against the stop p , and the ends of all three of the gage-points a' a^2 a^3 were in line when the point a^3 was fully back; and with the point a^3 set forward to indicate the true taper of the axle, and the stop T set against the stop p , no set of the gage could be made to bend the axle-arm forward by, to give the gather of the wheels when on the axle. Hence I have provided the hinge stop-plate U, which is of proper thickness when turned over between the stops T and p , to throw the gage-point a^3 back the required distance to indicate at the front of the axle-arm the point to which it is to be bent forward to secure the proper gather of the wheels. It will now be seen that the radius-bar B, carrying the gage-point a^3 , is free to be moved back and forth on its pivot b to carry its edge l' against the shoulder m of the gib M and its stop U against the stop p . The axle to be set will now be heated

next the collar as usual, and with the radius-bar held to the shoulder m the gage will be applied to the under side of the axle to bend the arm E' down by until the end e^2 of the arm touches the gage-point a^3 , which will give the correct set to the axle-arm to cause the wheel mounted on it to travel on a plumb spoke, and by applying the gage with its stop U against the stop p to the front of the axle, and bending the arm E' forward until its end at e^2 touches the stop a^3 , the axle-arm will be set properly to give the gather to the wheels. The radius-bar will of course be applied to the bottom and front of the axle alternately, or as may be required, to bend the axle-arm both ways in a single heat.

The adjustments of the gage may quickly be made, and the axles may be bent thereby both ways with accuracy. The gage-point a^2 may, if desired, be fixed to the main bar A on line with the pivot b of the radius-bar, but I prefer to fix said point to the radius-bar, as shown and above described.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. An axle-gage constructed with a main bar, A , graduated for a dish-rule at A' , a head, D , carrying a gage-point, a' , a radius-bar, B , graduated for a spoke-rule, as at B' , and pivoted to the bar A at b , and carrying a gage-point, a^3 , formed upon a right-and-left hand screw, G , entering fixed and loose nuts H I , and working in the head F , a gage-point, a^2 , fixed either to the bar A or radius-bar B in line with the pivot b of the bars, and means for stopping the movement of the inner end of the radius-bar both ways to indicate by the point a^3 the downward and forward bend of the axle-arm, substantially as described.

2. The combination of the bar A , having the dish-rule A' and gage-point a' , the bar B , having the spoke-rule B' , and a gage-point, a^3 , capable of transverse adjustment, the head K , fixed to the bar A , and provided with the stop p , the gib M , having a shoulder, m , means for fastening the gib, the fixed stop T and gather-stop U on the radius-bar, and a gage-

point, a^2 , between the gage-points a' a^3 , substantially as shown and described.

3. The combination, with the bars A B , pivoted to each other, and graduated at A' B' , as specified, of the stops T U on the bar B , the stop p on the bar A , the gib M , having a shoulder, m , and the set-screw S , for securing the gib, substantially as shown and described.

4. The combination, with the radius-bar B , having the point a^2 , and connected to the bar A , having the head D , provided with point a' , of the head F , provided with a screw, G , carrying the gage-point a^3 , and having right and left threads entering the fixed and loose nuts H I , respectively, and the gage-arm J , pivoted to the head, substantially as shown and described.

5. The head F , constructed with a right-and-left screw, G , carrying the gage-point a^3 at its head, and entering the fixed and loose nuts H I , respectively, and the gage-arm J , pivoted to the head, in combination with the pivoted radius-bar B , having the point a^2 and the lateral bend or deflection b' , and the bar A , having the head D , provided with the point a' , substantially as shown and described.

6. In an axle-gage, the following elements in combination: a main bar, A , provided with the plate P , having a stop, p , and with the adjustable head D , having the point a' , said bar being graduated for the dish-rule, as at A' , and carrying a gib, M , and means for fastening the gib, a radius-bar, B , pivoted to the bar A at b , graduated for the spoke-rule, as at B' , and provided with the fixed and movable stops T U , and said bar B carrying the head F , adjustable along the bar, and provided with the right-and-left screw G , entering the fixed and loose nuts H I , and carrying also the gage-point a^3 , the gage-arm J , pivoted to the head F , and an intermediate gage-point, a^2 , fixed either to the main bar A or the radius-bar B , all constructed and arranged to operate substantially as shown and described.

HECTOR MCQUARRY.

Witnesses:

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