

the same size of rivet; they must be full and neatly made and concentric with the rivet hole. The sectional area of the rivets must not be less than the sectional area of the joined pieces. All joints in riveted work, whether in tension or compression, must be fully spliced, as no reliance will be placed on abutting joints. The ends, however, must be dressed straight and true, so that there shall be no open joints.

23.—*Workmanship.*

All workmanship must be first-class in every respect; all abutting joints must be planed or turned; the maximum error allowed in length of eye-bars will be $\frac{1}{8}$ of an inch. All bars intended to be of the same length, must be exactly of the same length, so that any number of these bars piled upon one another, shall allow long pins, exactly filling the holes, to pass through both ends of the pile at once.

In all riveted works the joints must be square and truly dressed. Rivet holes must be spaced accurately and exactly opposite each other, so that when the several plates forming one member are assembled, a rivet $\frac{1}{8}$ th of an inch less in diameter than the hole can be entered hot into any hole without reducing or straining the iron by drifting.

24.—*Friction Rollers.*

Allowance must be made for expansion and contraction ranging over a difference of temperature of 150 degrees, and one end of each truss properly provided with expansion rollers.

25.—*Details.*

All connections and details of work must be of such strength that upon testing, fracture shall occur in the body of the member rather than in any part of the details. The eyes of all eye-bars must be forged in the solid. No welding will be allowed in any of the principal members. All rods with screw ends shall be so proportioned that the diameter at the bottom of the thread shall be $\frac{1}{16}$ th of an inch larger than any part of the body of the rod. The open sides of all trough-shaped sections shall be properly stayed by diagonal bracing. All abutting joints shall be properly secured against derangement by side shocks. All long rods must be secured against rattling or swaying caused by the passage of trains. All bed-plates must be of sufficient area and securely fastened to the masonry at the contractor's expense. The threads of all pins and rods not required for adjustment must be carefully upset after erection.

26.—*Testing Materials.*

All testing of materials shall be done by an approved machine, in point of accuracy, equal to the best lever machines.

27.—*Drawings and Strain Sheets and Calculations.*

With each tender a full set of drawings, showing every detail, must be furnished; also, strain sheets with details of calculations of strains in trusses and floor system, all of which become the property of the Government. All the spans must be erected on line as set out by the engineer in charge. They must be erected with a camber of one in twelve hundred ($\frac{1}{1200}$) by making the top chord longer than the bottom.

28.—*Testing Bridge.*

After erection, all the spans will be tested with a rolling load of one and one-third tons per lineal foot at a speed of twenty miles per hour. With this load the deflection in any span must not exceed $\frac{1}{1500}$ part of the span, and the structure must recover its original camber when the load is removed.