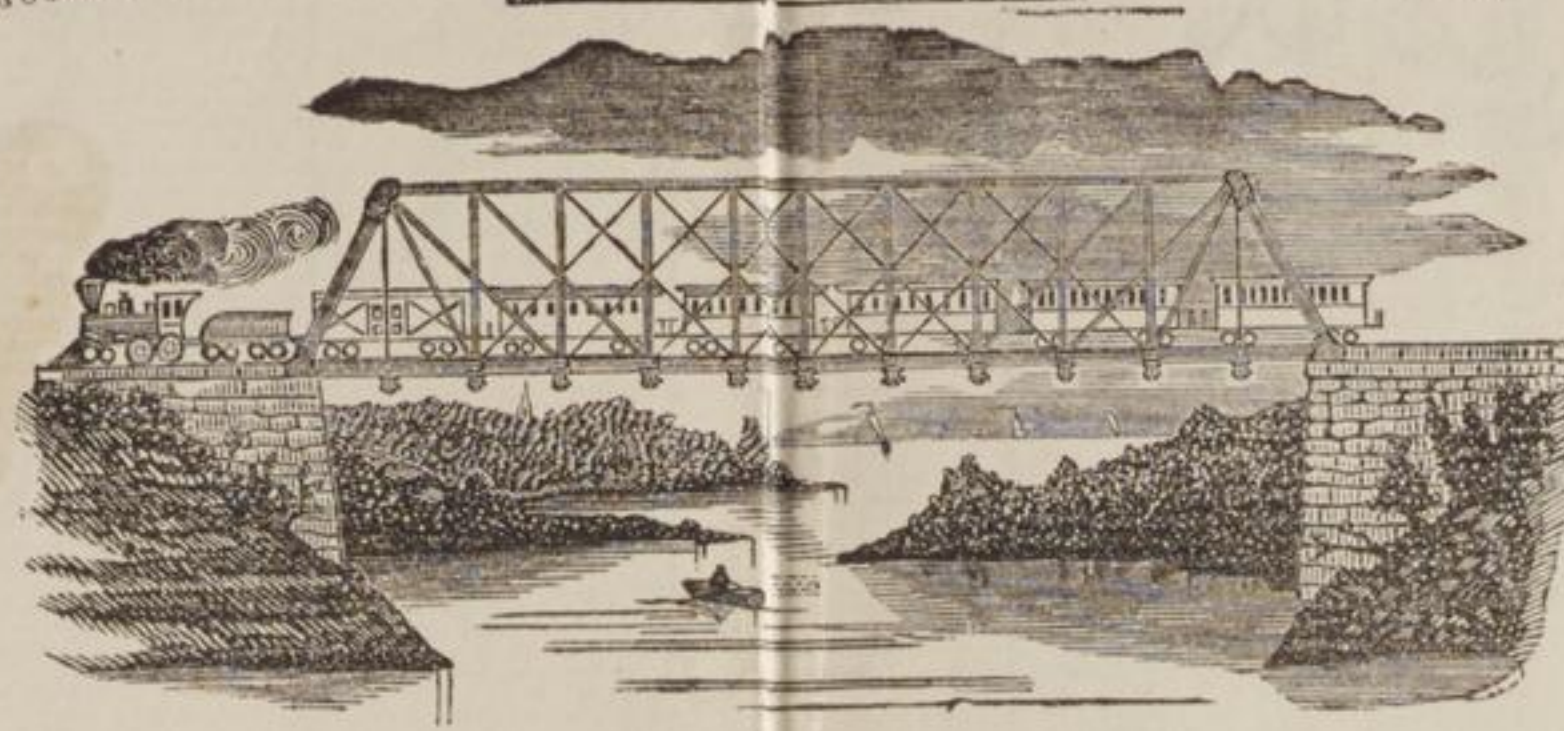


COLUMBIA BRIDGE WORKS.



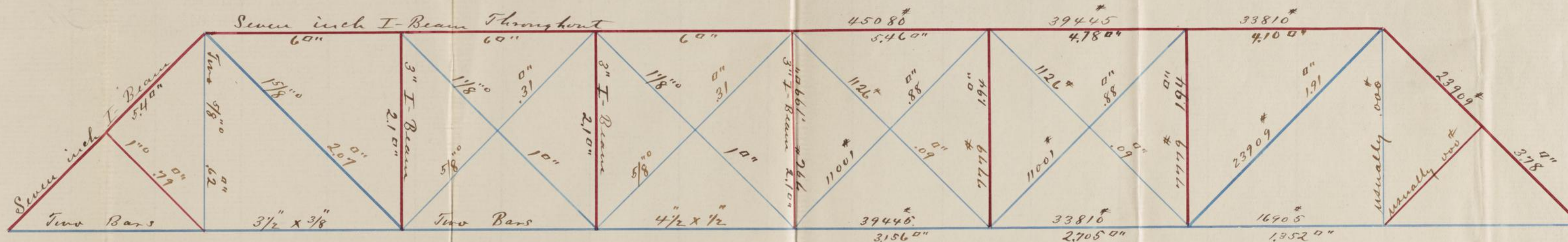
D. H. & C. C. MORRISON, Proprietors.
 OFFICE, Pruden Block, Cor. Main and Fifth Sts. Rooms 23 and 24.

SHOP: Shawnee Street, bet. Wayne and Fifth Sts.

DAYTON, OHIO.

SIZES IN INCHES AND ACTUAL AREAS IN SQUARE INCHES.

STRESSES IN POUNDS AND REQUIRED AREAS IN SQUARE INCHES.



Minimum Areas.

Required Areas.

PLAN OF BRIDGE, MORRISON'S PATENTED WROUGHT IRON QUADRILATERAL TRUSS.

Number of Spans.....	One	Number of Panels in trusses.....	Eight	Weight of Load per panel of floor (producing stress)...	17150*	Stress (compression) on Posts per sq. in.....	6825	Enter	4000*
Length of Spans (c to c of End Pins).....	49'	Length of Panels in trusses.....	6125	Wt. of Bridge & Load per panel of floor (producing stress)	22540*	Stress (shearing) on Pins or Pin Bolts per sq. in.....	9000*		
Height of Trusses (c to c of Chords).....	6125	Weight of Bridge per lineal foot (producing stress).....	440*	Stress (compression) on Top Chords per sq. in.....	8256*	Total strength of one Span in tons.....	280.3		
Width of Wagon-way in the clear.....	14'	Weight of Load per lineal foot (producing stress).....	1400*	Stress (tension) on Bottom Chords per sq. in.....	12500*	Total weight of one Span in tons.....	10.78		
Width of Side-walks in the clear.....	—	Weight of Bridge per panel of floor (producing stress).....	5390*	Stress (tension) on Diagonals per sq. in.....	12500*	Total strength in excess of weight of bridge.....	169.52		

All of the Principal Members of the Bridge will be of Wrought Iron.

The Upper Chord will be constructed of I beam iron, laid with its flanges in vertical planes, as represented in the drawing, giving all the vertical stiffness required in a panel length, or between supports, and laterally the great bulk of material being removed to the farthest distance from a vertical plane, passing through the center of the Truss longitudinally, makes it by far the stiffest and strongest chord in that direction. All the joints are butt joints, and are truly planed or turned so that all of the material must act; which is not the case when the pieces forming the Upper Chord are lap jointed and riveted. The Lower Chords will be what are termed "Flat Bar Chords," lap jointed; each joint having *seven to five* joint bolts, *seven to eight* inches in diameter, making a shearing area equal to one and one-third times the tearing area of the bars of which the chord is made, and the bars are increased in sectional area sufficiently to allow of the holes being made, and still retain the required sectional area. This makes the chord about one-sixth heavier than would be absolutely necessary to resist the horizontal strain, but adds weight to the bridge, which prevents vibration from large moving loads; the stretching of the chord under the maximum load is also reduced one-sixth at all points except just at the holes in the joint. The

long lap joint with numerous bolts adds very greatly to the vertical stiffness of the bridge over what a single large bolt would do, owing to the fact of the single bolt acting as a pivot, around which, to a certain extent, the chord will turn whenever a large panel load passes over the bridge.

The Posts will be constructed of I beam iron.

The End Posts of one *seven* inch I beam, struttet at the middle of their lengths, to prevent the possibility of the posts being moved from their positions, by accidental blows or shocks from vehicles or other moving loads.

The Intermediate Posts are formed of *three* inch I beam.

All of our posts have square ends and fair bearings. This form of post as represented in the drawing is one of the best, if not the best used in Low Truss Bridges. They are square on both ends, and the lower end rests on a cast iron shoe, which rests on the rigid chord, having no tendency to turn or revolve around a pin, as in other bridges whose posts should be calculated as a strut with one end hinged. This is another benefit derived from our chord connections. These posts, as represented in the drawing, are strictly first-class.

The main Diagonals and Counters will be constructed of round, square or flat bar iron, having cross sections as shown on the diagram. The lower ends will have eyes formed by bending the full

sized bar around and lap welding, the length of the eye on the inside being twice the diameter of the bolt on which it connects; the bolts on which the diagonals connect will be *one and three-eighths* inches in diameter.

The Floor Laterals will be formed of round bar iron, and will be *three-quarter* inches in diameter.

If Iron Floor Beams are used, they will consist of the *—* inch I beam, trussed by *—*

— inch round rods, and will be struttet at two points in each roadway, and adjustable by sleeve nuts. The form of the strut is an equilateral triangle, so that the beam is trussed both vertically and laterally, which is not the case with any other floor beam, unless some bidder has copied our design. The web where the truss rods connect with it is assisted and strengthened by plates riveted to it. When the beam is suspended, there is a T iron riveted on top at each end just between the chords, so the laterals which are attached to the chords can not draw them inward. In this way we get the full benefit of our laterals, which would not be the case did we attach to the beams (as others do) which can move horizontally along the chord to a small extent, but enough to produce or permit vibration in the bridge. We claim the *best* floor beam. If Trussed Floor Beams are not desired, we will put in the *10 1/2* (35*) inch I beam, as represented in the drawing.

Floor Joists will be *four by seven* inches and *seven* in a panel. Strick Sills will be *four by six (Pine)* inches and *two* in a panel. Floor Planks will be *two and one-half by eight to ten* inches in cross section. Guard Plank will be *two by twelve (Pine)* inches in cross section. The Floor Planks will be well spiked down to the Floor Joists.

All lumber (not otherwise specified) will be of good White or Burr Oak timber. All iron used to be of the best quality of Bridge Iron, and will receive two coats of good mineral paint and flaxseed oil. The entire work to be performed in a first-class manner, and to the satisfaction of the parties interested.

When Sidewalks are wanted, the floor beams will be extended out for their accommodation, and there will be used for the floor *—* floor joists in each walk *—* inches, and the planks will be White Pine *—* inches. A neat substantial hand-railing will be attached to the outer ends of the floor beams.

If Wooden Floor Beams are used, they will be *—* inches in cross section.

Columbia Bridge Works, D.H. & C.C. Morrison Proprietors, Dayton, O.