The principal occasions where wrought iron will be exposed to a transverse strain in bridge building, will be in cylindrical pins for connecting other parts of the work, in which cases the forces will act with a certain leverage which can be nearly determined, and denoting by $a$ the area of the cross section of the pin in square inches, and by $d$ its diameter in inches, and by $b$ the length between the centres of bearing at the ends, we shall have $4 \times 5,000 \frac{ad}{b} = \text{the number of pounds the pin will sustain in the middle with safety}$. A pin 1 inch in diameter has a cross section of $.785$ inches $= a$, and if $b = 6$ inches, we have, by substituting these values in the last formula, $4 \times 5,000 \times 1 \times .785 = 2,620$ lbs., which an inch pin will bear in the middle when supported at 3 inches from the middle each way.

It will be seen that this formula regards a cylindrical bar of a given cross section to be capable of bearing the same force, acting on a leverage equal to its diameter, that a square bar of the same section can bear on a leverage equal to the width of its side; a supposition which my experiments on cast iron sustain, though differing from the result of calculation.

BRIDGE WITH THE ARCHED TRUSS.

LI. For the general plan of this truss, reference may be had to figures 5 and 8, pages 10 and 19.

The arch is composed of a number of cast iron pieces, exceeding by one, the number of principal bearing points, $b.c.d.$ &c., fig. 8, page 19. In this plan I suppose the road way to be along the chord of the arch, or slightly cambred according to circumstances, or the taste of the engineer.

The cross section of the arch pieces may be of various forms, but there are only two which I would recommend; the one is the form adopted for my canal bridges, and the other is that of hollow cylinders, which is more economi-