Among the public works now in course of completion at Washington, is the Aqueduct Bridge over Red Creek, at the western end of Pennsylvania avenue. This bridge is a single iron arch of 20 feet rise and 200 feet clear span between the abutments. The arch consists of two ribs, each of which is composed of 17 cast iron pipes of 48 inches internal diameter and 12 feet 3 inches in length. They have flanged ends pierced with holes for screw bolts, by which the pipes are firmly connected together. After being cast, they were placed in a lathe, and the ends and flanges were accurately turned or faced. They were put together in the form of a strait line, the faced ends abutting against each other, and 40 screw-bolts firmly secure each joint. Such is the accuracy obtained by the present use of machinery in engineering, that these joints are water-tight, under the aqueduct pressure of 120 feet head, by mere application of the dressed surfaces of cast iron, no packing or cement being used in the joints.

Upon these two arched ribs, which are firmly connected with each other by cast iron tubular crossbeams and heavy wrought diagonal ties, is erected a framework of heavy rolled iron "H" beams (from the works of the Phoenix Iron Company of Philadelphia), supporting two continuous horizontal girders, 204 feet in length. Upon these girders rest crossbeams of timbers, supporting the roadway of the bridge, which embraces two city railroad and carriage tracks, and two paths for foot passengers.

The cornice of the bridge is decorated with moldings of cast iron, and a light wrought iron railing surmounts the whole.

The abutments, founded upon solid rock, are built in the most substantial and durable manner, of fine gray sandstone, obtained in large blocks from the government quarries at Seneca, upon the Chesapeake and Ohio Canal, 24 miles from the city of Washington. The strength of the stone is 17,000 pounds per square inch.

The interior of each abutment contains the connecting pipes and stopcocks for regulating the flow and discharge of water; and in the western abutments on the Georgetown side, one of the vaults serves as an engine-room and contains a water-pressure engine—the first, it is believed, erected in this country.

The engine, drawing its supply from the cast iron street mains, pumps 10,000 gallons of water per hour into a reservoir on the heights of Georgetown, a mile distant, and 204 feet above the machine. The reservoir supplies that portion of Georgetown which is above the level of the great store and distributing reservoirs of the Washington Aqueduct. In a recent experiment, the engine, using 10,863.2 gallons of water per hour, under the effective head of 99.86 feet, pumped 10,832.6 gallons of water per hour, or 9.86 feet loss. This is the highest effective head or resistance of 90.345 feet. This gave an useful effect of 886 of the power employed; the loss being absorbed in friction, in producing motion of the parts of the engine and of the water and in leakage, the latter alone being about 2 per cent. of the water used. The engine was designed by Wilesbach for the efficiency of...
the engine alone, the efficiency of the engine and pump being considered equal, 12⁄3 of the total loss of effect being due to the motor, the efficiency of the motor here used is 933, a very high result. The engine and pumps were built by H. R. Worthington, of New York city, under his patent of 1855.

The Washington Aqueduct has other works not less remarkable than the one described; among them, the great granite arch, by which the masonry aqueduct, nine feet in diameter, crosses the Cabin John Creek, at a height of 101 feet above the bed of the stream. The arch, built of huge granite, is 20 feet wide, 57 feet 3 inches rise, and, being 250 feet in clear span, is the largest stone arch in the world.