

the use of transverse bulkheads is a hindrance during construction, and a certain defect afterwards. Every structure stands upon its own bottom, however, slip joints having been formed at all junctions, and the results are most satisfactory after severe accidental tests.

Many "plums" were used in all the walls, some of "one-man" size stone, where the wall was narrow or derricks could not be had. Foundation concrete made of 1 to 5 mortar and 10 parts broken stone has given good results. No limitation of masonry coursing was permitted, but the layer marks were obliterated by a thorough coating of cement whitewash.

In the spay walls L-bolts are embedded by which horizontal 9 x 18-in. oak fenders are attached at about water level.

again, and all the repairs necessary was to grout up the cracks.

MACHINERY.

At each lock there are four submerged "Stoney" sluices 6 x 6 ft. They are of the well-known "Stoney" type—a plate of steel fortified by I-beams and sliding upon nests of live rollers at each side. The valves are hung by chains passing over pocket wheels on a horizontal shaft with counterweights on the free ends (Fig. 14). The shafts can be evolved either by hand or by electric motors. These and the lock gates are arranged for operation from a switch house situated at the middle of the lock on the north side.

The lock gates are closed and opened by a steel I-beam having a rack attached to one side, into

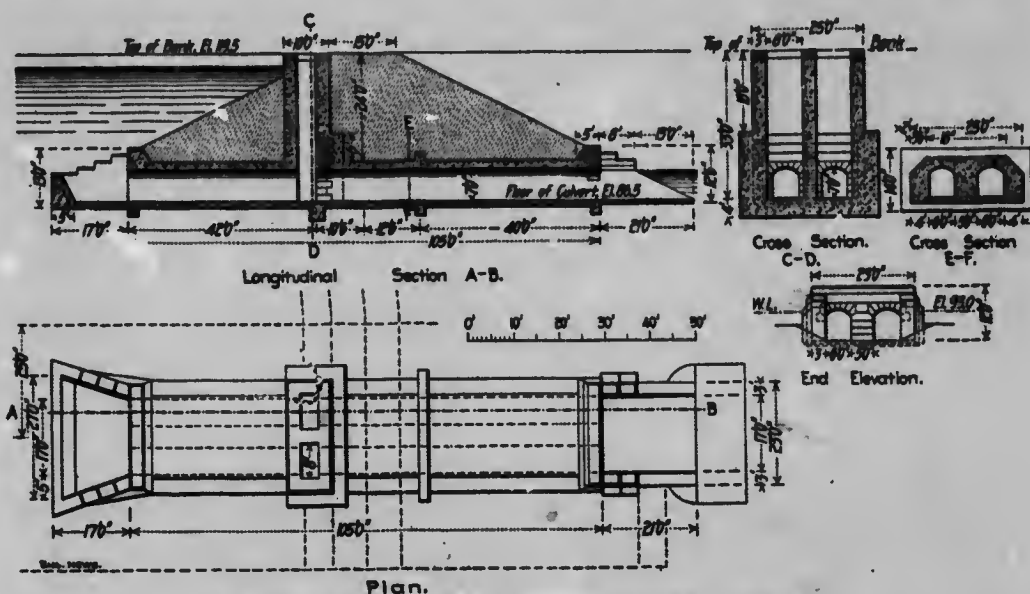


FIG. 17. DETAILS OF RECTANGULAR CULVERT; LOCK 2.

ARCH BRIDGES.

Along the south side of the reaches arch bridges are placed through which the side ponds connect with the canal proper (Fig. 14). These arch bridges are concrete monoliths in which a succession of arched openings 15 ft. span and 8.75 ft. rise are left. The bridges are all 10 ft. wide and have a stone coping on each side. A concrete platform 12 ft. wide and 2 ft. thick was first laid, and upon this the piers were built. Though many foundations are upon clay, timber grillages have not been used at all. Cracks in concrete slabs have been rare and of no consequence. In places where it was impracticable to keep structures flooded during winter the foundation slab with arches upon it was raised bodily 6 ins., but settled back to place

each a pinion meshes. The point of attachment of the strut to the 42-ft. gates is 16 ft. from the bottom and 14 ft. from the heel. A chamber is provided in the lock walls into which the gate arm recedes.

For hanging the lock gates a pontoon (Fig. 18), 30 ft. square and drawing 10 ft., with a square tower about 30 ft. in height and the full size of the hull is used. A gate leaf is raised from a floating position to hang vertically against one side of the tower by wire cables passing over the top and wound around winches on each side. The gate is then floated into its recess, gently lowered onto its heel pivot and the top secured by a steel collar fitting over a gudgeon pin. R. & J. Miller were the contractors.