Flev. 160.00

Elev. 158.33

Yass B Concrete

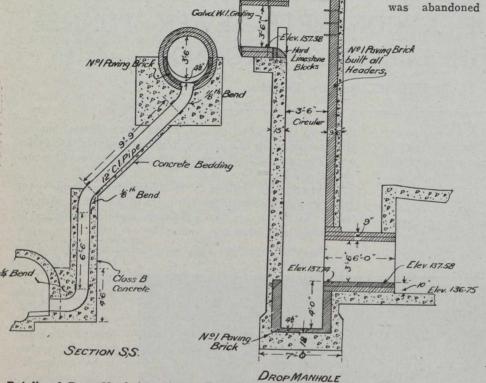
mit, either before or after the side-walls and arch. Sub-drains are not shown, but are called for in the specification to be provided, if necessary, at the contractor's expense.

The contract was started in March, and completed December, Tunnel shafts were sunk 1012. at various time intervals at stations 13 + 06, 16 + 40, 20 + 20,

two miners and one mucker-two muckers being required as the haul became longer.

In the other direction quicksand appeared in the bottom of the tunnel about 150 feet in, and rose above the crown a few feet further on. Water became troublesome at this point and the siphon in the shaft had to be replaced by a 4-inch pump.

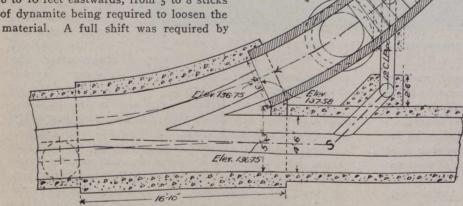
The method of excavating was now altered, and with 6 x 6 cap and by timbering an advance of only four feet was made in a double shift. After several runs of semi-liquid pockets, extending almost to the surface, the heading was abandoned and bulkheaded at station 29 + 62.



DROPMANHOLE Details of Drop Manhole and Junction Chamber at Christie Street.

23 + 06, $26 + \infty$ and 31 + 20, numbered respectively 6, 5, 4, 3, 2 and 1, and headings were driven east and west from all shafts. The depths of the shafts are as follows: No. 1, 34 feet; No. 2, 35 feet; No. 3, 35 feet; No. 4, 37 feet; No. 5, 35 feet; No. 6, 31 feet deep. The shafts for manhole and tumbledown shafts at Christie Street were 33 and 44 feet deep respectively. The open cut part has a varying cover from two to eight feet.

Shaft No. 1 was sunk through very hard clay, containing several springs, and tunneling (the invert being excavated after the side-walls were placed) progressed at a daily rate of 8 to 10 feet eastwards, from 5 to 8 sticks of dynamite being required to loosen the



W.I. Grating

Junction Chamber at Christie Street.

No. 2 shaft was sunk through firm clay to sand water appearing at a depth of 27 feet. This shaft had to be lined with 134 tongued and grooved sheeting, in addition to the 2-inch boarding with 6-in. by 6-in. walings. The ground eastward soon became

hard and dry, and good progress made for 200 feet, when soft pockets appeared in the roof and sides. This necessitated the heavy timbering, but after a run of about 20 cubic yards from the roof at station 28 + 28 the contractors decided to abandon tunneling and to open out the part to connect the two tunnels.

In the other heading fine and coarse sand were encountered, the timbering here being 1-inch closeboarding up to springing line with crown and quarter planks in roof. This became hard, stoney clay about 180 feet in with occasional soft pockets in roof causing slower progress. After going another 28 feet this heading was stopped owing to grade going with the tunnel