with the points. When needed, the line was marked by a temporary point opposite the forward ends of the new wall-plates, the position of the last wall-plate being always tried as a check. The level was then set up in the heading, bench marks being established in the tunnel, and the wall-plate was alternately shifted in grade and alignment until both were satisfactory. A miner's lamp, held close to the face of the rod, proved sufficient to illuminate both it and the cross-hairs of the instrument. The wall-plates were normally set $\frac{1}{2}$" narrow, $\frac{3}{4}$" high, and canted slightly inwards, these allowances being made to provide for the unavoidable settlage under compression. When the heading was holed, the line and levels met within $\frac{1}{4}$ inch.

MEASUREMENT OF EXCAVATION.

At every set of timbers a regular series of offsets was taken by the inspector from the outside of the frame to the face of the rock, four measurements being made from each plumb post, one from every arch joint and one from the centre of each arch segment; the measurements of the sets on each wall-plate were averaged, and these averages were recorded as the measurements of that wall-plate length and the area and contents calculated therefrom; the recorded measurements read as if taken from the arch centre. The system of measurement proved very convenient; the step by step method of excavating and timbering would have seriously hampered any other system, but with this the inspector could always make his measurements whenever the excavation was complete and the timber frame in place, and the lagging and packing might immediately proceed. Any error in the relative placing of the timbers would, however, be reproduced in the measurements. These sections were taken as a precautionary measure, it being specified that the work would be paid for by theoretical dimensions.

COST.

The prices and costs were as follows:

11,726 Cy.	Excavation at $2.85	.....	$33,419.10
742	Packing 1.75	.....	1,298.50
256	Fallen Material 1.25	....	320.00
303,000	Ft. B.M. 30.00	... .	9,090.00
	624 lin. ft. of tunnel	.....	$44,127.60

these figures being contract prices, the actual cost being probably in the neighbourhood of $35,000. In the approaches the prices were solid rock, 80 cts. per cub. yd.; loose rock, 40 cts.; and earth, 20 cts. White oak timber was delivered on the ground for $15.00 per M., and cost $3.00 for framing. Common labour was worth $1.45 a day in the tunnel, and the miners were paid $1.75.

MASONRY.

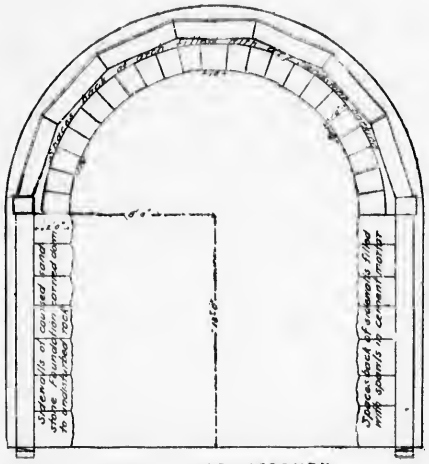

FIG 8 SECTION OF MASONRY