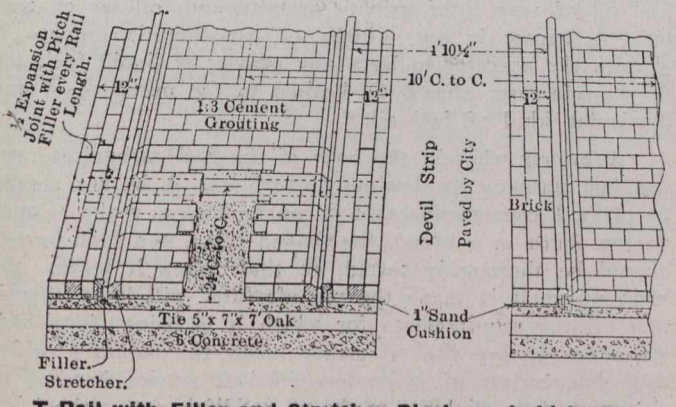
Three or four years ago—perhaps a little longer—Mr. Buchanan published a series of tests made for one of the eastern railways—I think it was the "Panhandle." In some of those tests, which were made on the top chords of bridges loaded on the pins with a certain eccentricity, the deflections which he gives will be found to correspond almost identically with those calculated, but those columns did not fail at the maximum stress which was calculated. Why? Nearly all of them, I think all of them, failed in the details, particularly at the end plates; and I think that is true of nearly all tests of full sized columns made up of riveted shapes. They do not fail at the maximum stress figure, but they fail in the details.

What is needed is more experiments like those recently performed at the University of Illinois, in which they were testing the strength of riveted joints. As far as the columns are concerned, it does not seem to me that there is much need of testing a great many columns in the laboratory until we know how to make the details properly, and then it is not at all certain that the tests will be of any great value, because the failure of a column depends upon how carefully it is fabricated and just how the load is applied, and to apply the load very carefully in any one position in practice is almost impossible. We cannot duplicate in practice the conditions of the laboratory, so that the results which are obtained in the laboratory will not correspond to those obtained in practice.

STREET RAILWAY CONSTRUCTION.

The Des Moines (Ia.) City Railway is using for standard track construction in paved residence streets having ordinary traffic the combination of materials shown in the accompanying drawing, a description of which appeared in a recent issue of the Electric Railway Journal.

The foundation for this track consists of 6 in. of concrete below 5-in. x 7-in. x 7-ft. oak ties spaced 2-ft. centres, with 2 in. of concrete above the ties and a 1-in. sand cushion



T-Rail with Filler and Stretcher Block, as Laid in Des Moines, Ia.

for the paving. The rails, which are the Lorain 80-335 section, 7 in. high, with 6-in. base, 2⅜-in. tread and 7/16-in. web, are connected every 6 ft. by 5/16-in. x 2-in. tie rods. The interesting feature of the paving is the use of the Nelsonville (Ohio) Brick Company's filler and stretcher blocks in connection with the T-rail. The filler blocks are 2 in. x 5 in. x 9 in. and the stretcher blocks 3¼ in. x 4 in. x 9 in. in size. Pitch filler is used for the joints between them. The other paving used on the street is of cement-grouted brick, 4 in. deep, as shown in the illustration.

NEW WESTMINSTER'S HARBOR

Seeing that a bill will shortly come before parliament to make New Westminster a national port; that most extensive plans for the development of this port have been drawn up and the first work is being carried out; and that the development of the Pacific Coast ports is of importance to the whole of Canada, the following authoritative facts concerning New Westminster and the Fraser River, which can be relied on, are of much interest:

New Westminster is situated on the Fraser River, 18 miles from the sea.

The harbor extends from the head of Douglas Island (about 28 miles from Sandheads Lightship) down the north arm to salt water, south to the international boundary and up the south arm to Douglas Island. The length of the main deep-water channel (or south arm) is 28 miles, and 14 miles is the length of north arm for log towing and small vessels. The depth is 14 feet at low-water, and 26 feet O.S. high-water at Sandheads. When the Dominion government's work at the Sandheads is finished these depths will be 25 feet at low water and 37 feet at high-water. Along 1.7 miles of municipal waterfront there is an average depth of 40 feet.

There is 12 feet of tide at the Sandheads and 5 feet at New Westminster. Marine growth dies and falls off in the river water in ten days or so. The water is good for boilers.

Pilotage fees are $1.00 per foot of vessels' draught and 1 cent per registered ton each way, half charges if no pilot is employed.

Harbor dues are chargeable as follows on vessels of

	50	tons and under		.....	$ .50
over	50	tons and not over		100.....	1.00
"	100	"	"	200.....	1.50
"	200	"	"	300.....	2.00
"	300	"	"	400.....	2.50
"	400	"	"	500.....	3.00
"	500	"	"	700.....	4.00
	700				5.00

Dock dues are not charged; wharfage amounts to 50 cents a ton. The railway makes no charges on freight delivered from or to their own trains. One dollar a day berthage is charged where any charge at all is made.

The principal wharves are those of the Canadian Pacific Railway, 340 feet long; Canadian Pacific Navigation, 700 feet long; British Columbia Transport, 600 feet long; British Columbia Electric Railway; Great Northern Railway, and that of the Canadian Northern Railway at Port Mann, 1,000 feet long, and many other privately leased wharves. The railways, the Canadian Pacific Railway, Great Northern Railway and British Columbia Electric Railway, parallel the waterfront and run on to the wharves. The land and waterfront lend themselves to unlimited development along these lines.

Towage is unnecessary except for sailing vessels, when charge is a matter of bargain. Large vessels coal at Vancouver Island points, as they do when calling at any British Columbia port. Small supplies of coal are to be had locally. Locks are unnecessary on the river.

There are good machine shops and boiler works in New Westminster, capable of carrying out any repairs. The Dominion Government dredge "Fruhling" is at work at Sandheads, King Edward, on north arm. The municipal dredge will soon be at work improving the city waterfront by filling Front Street and carrying the harbor line further out to an unbroken quay over a mile in length.