

pairs to the hammer drills employed was only  $1\frac{3}{4}$  cts., approximately, per foot of hole. At the Marshall-Russell tunnel, where hammer drills were employed, the average cost of drill repairs from June, 1908, to June, 1911, was  $1\frac{1}{2}$  cts. per foot drilled. Piston machines were used at the Strawberry tunnel from January, 1909, to September, 1911, the cost for repairs being nearly  $2\frac{1}{2}$  cts. per foot drilled. On the Little Lake division of the Los Angeles aqueduct, where hammer drills were employed, the average cost of drill-repair materials from July, 1909, to May, 1911, as shown by Table I., was only 24 cts. per foot of tunnel excavated. As each of the two machines in the heading drills approximately 8 ft. of hole for every foot of tunnel excavated, the cost per machine per foot of hole is  $1\frac{1}{2}$  cts.

For 1910 and the first half of 1911 the repair cost of hammer drills at the Carter tunnel was 2 cts. per foot drilled. At the Lucania tunnel the repairs cost  $\frac{1}{2}$  ct. per foot drilled, but the hammer drills had been in use only one month at the time the tunnel was visited. The hammer drills at the Rawley tunnel were new also, the repairs for June and July, 1911, averaging 1 ct. per foot of hole.

### ECONOMICAL STREET SPRINKLING IN CALGARY.

The city of Calgary has about 1,300,000 square yards of street pavements covering in the neighborhood of 54 miles of streets. The equipment for street sprinkling and flushing consists of four horse flushers, four rotary brooms, two squeegees, five horse sprinkling tanks and two 5-ton electric motor trucks.

The total motor vehicle equipment consists of eight electric trucks. Besides the two just mentioned, there are two 3-ton trucks for the waterworks and stores department, one 5-ton truck for the sanitary department and three 1-ton trucks for the electric light and street railway department. These were all supplied by the General Motors Company.

With respect to the electric sprinklers and flushers, it is stated that during the season of 1914 they saved the city \$24 a day in the cost of watering streets. They were operated nine hours in the daytime for sprinkling and eight hours at night for flushing. They averaged 38 miles each per day and 17 miles each per night. They used \$1.30 worth of electric power per truck during the 17 hours. In addition to this saving, the other six motor vehicles showed similar economy and it is the intention of the city to replace horse-drawn equipment with motor trucks for all municipal work.

The following are the specifications for the 5-ton electric sprinkler noted above:—

Water capacity of tank, 1,200 U.S. gal.; total length of tank, 160 in.; inside diameter, 51 in.; air compartment in forward end of tank, 36 in. long—25 per cent. of tank volume; pressure in air tank, 65 lb.; total weight of tank, 3,600 lb.; tank provided with air and water pressure, gauge and pop safety valve in by-pass connecting water space with air chamber. The tank is filled by means of a  $2\frac{1}{2}$ -in. water intake valve located in the centre of the rear drum-head. The water discharge is controlled through lever gate valves operated by hand at the driver's seat. The two flusher nozzles may be worked together or independently. The main outlet connection is a  $4\frac{1}{2}$ -in. standard pipe; the flushing nozzle connections,  $2\frac{1}{2}$ -in. pipe.

## Coast to Coast

**Winnipeg, Man.**—The city quarries made a profit of nearly \$16,000 in 1914. Plant No. 1 disposed of 77,770 cu. yards of stone. Plants No. 2, 3 and 4, while not so extensively operated, record very favorable production.

**Basque, B.C.**—The Canadian Northern Railway completed the laying of steel on its main line between Lake Superior and the Pacific Coast at this point on January 23rd, 1915. Ballasting is being proceeded with and will probably be completed in April.

**Quebec, Que.**—It is stated that legislation will be introduced at the present parliamentary session for another loan of \$10,000,000, to be spent on good roads under similar conditions to those which governed the expenditure of the \$10,000,000 borrowed in 1912.

**Ottawa, Ont.**—The sinking of the foundations of the Victoria Memorial Museum, discovered a few years ago, continues, and extensive repairs are necessary, as considerable danger exists. The Department of Public Works has called in experts to make an examination.

**Calgary, Alta.**—The city gas committee has decided to put in a number of experimental gas installations to test out various kinds of burners and to secure accurate information regarding mixtures of air and gas, etc., including also the testing of a coal furnace converted to gas burning. Mr. Geo. W. Craig, city engineer, is a member of the committee.

**Toronto, Ont.**—It is stated that the provincial government has under consideration a patrol system for supervising and maintaining the highways of the province. If this scheme is carried out, it will provide employment for over 200 men. For some time the Ontario Government has been considering the problem of maintenance, and it is thought that when instrumental legislation pertaining to the \$30,000,000 scheme is brought down in the legislature provision will be made for the satisfactory up-keep of roads.

**Prince Rupert, B.C.**—Of the twelve large reinforced concrete pontoons required in connection with the construction of the new floating drydock, described a short time ago in this journal, six of them have already been launched, and it is expected that the pontoon work will be completed by next June. The shipbuilding plant is in an advanced stage of construction. The shops have been practically completed, and machinery is being installed. The Prince Rupert dock is being built in three sections.

**Calgary, Alta.**—About \$87,000 worth of bridge work is under consideration at the present time. Mr. Geo. W. Craig, city engineer, states that to complete the abutments and piers of the Mission bridge it would take \$5,500; to complete the abutments and piers of the Louise Bridge it would require \$3,500, and for the same work on the Center street bridge it would take \$55,000, and to do the necessary grading for the approaches to the Center street bridge it will take \$23,000, bringing the total amount required up to \$87,000.

**Winnipeg, Man.**—Local improvements in Winnipeg are valued at \$12,654,216.18. Sewers, \$3,282,872.88; asphalt pavements, \$6,588,305.51; macadam pavements, \$225,226.01; cedar block pavements, \$260,942.29; sandstone block pavements, \$4,902.26; westrumite pavements, \$20,012.08; gravel pavements, \$5,486.68; granolithic sidewalks, \$976,871.17; plank sidewalks, \$288,485.67; sanitary improvements, \$34,567.49; street and lane openings, \$637,520.31; boulevards, \$70,715.74; ornamental gateways, \$9,527.70, and ornamental street lights, \$248,780.39.