

as the smoothing out of the brick surface was very noticeable after the first trip of the roller. The rolling of all the bricks laid in one day was completed every night, so that if the weather became rainy there was no chance of the cushion setting before the bricks had been properly rolled. It is needless to say that we did not mix any more cushion materials than was required for one day's work.

(7) **Cement Grouting.**—The grouting was done as soon as possible after the bricks had been rolled down. These bricks were first thoroughly sprinkled, with the double object of supplying enough water to the cushion for setting purposes, and the thorough wetting of the bricks themselves. The sand and cement of the grouting were mixed dry in equal proportion, one to one, and to a uniform color. Batches of about two cubic feet were placed in specially constructed portable mixing boxes, having one corner lower than the others, the water being added very slowly and the mass thoroughly mixed with a hose until its consistency was liquid enough to allow it to flow without separation of the ingredients. This grout was then poured on the bricks with large scoop shovels and spread well into the joints with hand-squeegees, and the operation gone over until the joints were completely filled. The grout was always sufficiently fluid to thor-



Fig. 2.—Applying Cement Grout Filler at Outremont, P.Q.

oughly fill the lower part of all joints and flow several joints ahead of the squeegees, oozing up to the surface as more grout was pushed ahead. I am perfectly sure that every joint was filled up with the grouting from top to bottom, and that none of the cushion material partly filled the joints.

(8) After the grouting operations were finished, the pavement was well covered with tarpaulins or cement bags, and kept moist for several days, thus insuring the slow settling of the grout.

(9) Vehicular and pedestrian traffic was kept off the freshly made pavement for a period of at least fifteen days, according to the weather and temperature. When pedestrian traffic had to cross a section of the freshly made pavement, a thick layer of sand was spread over it and heavy planks laid over this sand; so, in no manner did the pavement receive directly any traffic.

(10) I personally gave this considerable attention, and aided by my assistants, every detail of the work was carefully supervised. No highway engineer can expect to have good results on brick pavement without the most minute supervision of every detail of the construction.

The bricks specified for this pavement were of the type known as the "Wire Cut Lug Brick." The main advantages in using these bricks are that the joints are all uniform in width on account of the presence of the lugs which maintain the bricks at an equal distance from one another, and also the fact that the bricks have square corners, and that the joints can be filled from top to bottom at an uniform width without any danger of the grouting being chipped at the surface, as in the case of bricks with chamfer corners. These bricks had to comply with the general clauses adopted by the American Society of Municipal Improvements.

The wire cut lug bricks that were used were tested as follows:—

Abrasion test averaged thin blocks: At 600 revolutions, 8.55%; at 1,200 revolutions, 12.00%; at 1,800 revolutions, 14.21%.

Absorption test: 1.21%.

In conclusion, I must state that the advantages of brick roadways are as follows:—

- (1) When properly constructed with the right materials, they will wear smooth without being slippery.
- (2) They are the most sanitary pavements known, being easily cleaned and absolutely dust-proof.
- (3) They are practically noiseless.
- (4) They are economic in the long run as they require very little attention and maintenance.
- (5) They can be cut through when required and easily repaired at small cost without any cumbersome plant.

Charcoal is almost an ideal furnace fuel. It is nearly free from sulphur, having only a few hundredths of 1 per cent. in coke and about 1 per cent. of ash against about 10 per cent. for coke.

There is a remarkable tendency observable in tissues and cotton when moistened with oil, to become heated when oxidation sets in, and sad results often follow when the tendency to take fire is neglected. A wad of cotton used for rubbing a painting has been known to take fire when thrown through the air. The waste from vulcanized rubber, when thrown in a damp condition into a pile takes fire spontaneously. Masses of coal stored in yards frequently take fire from spontaneous combustion without any spark of fire being applied to the mass. It is good to know such things and to guard against mysterious fires.

In an action against a railroad it appeared that the plaintiff was walking on a parallel track used by another road and upon the ends of the ties next to the defendants track, about 5½ feet from the ends of the ties on the defendant's track, when he was overtaken and run over by a heavy freight train drawn by two engines on an upgrade and a partial curve. The train, which had stopped for water at a tank about 485 feet back, was running from 3 to 25 miles an hour. The plaintiff testified that he was drawn under one of the cars by the suction caused by the speed of the train, and his leg smashed. There was evidence that no suction could have been produced at the speed the train was going, and that even at a greater speed than 30 miles an hour, trains had frequently passed close to section hands repairing the track without any such effect being produced; also that the effect produced by a rapidly moving train would be merely to split the air and drive objects away from it, such as dust from the track and hats from the heads of men standing near it, the force of the wind being away from the train rather than towards it. The jury returned a verdict for the plaintiff, which the trial court set aside, for the reason that there was no evidence to support it, and entered a judgment of non-suit. On appeal this was affirmed by the North Carolina Supreme Court in an exhaustive opinion. The court held that the plaintiff's injury, if occurring as the result of suction created by the rapidly moving train, was an unusual occurrence such as the engineer could not have reasonably expected would result from the rapid movement of the train, and hence such movement was not negligence.