

result in bad work. The angle of the courses with the curb should be frequently tested to keep them in proper range.

Where the street is crossed by another street at right angles or nearly so, it is best to range the courses according to the herring-bone method. This will prevent wearing of joints, as it is impossible for traffic to follow the joints in that case. If an intersecting street crosses at an oblique angle of not less than 15 degrees from a right angle, it is best to pave the courses at right angles to side line as in the sections between street, and the same method should be followed at streets which connect with the street being paved, but do not cross over. The stones in the courses should be laid close together so as to break joints with the next course with a lap of at least  $2\frac{1}{2}$  inches.

The joints on the sand base should be not more than  $\frac{3}{4}$  inch wide, and on the concrete base not more than 1 inch wide.

In the work having a sand base or foundation, when the paving blocks are laid, a layer of clean, coarse sharp sand, free from dirt or pebbles, should be spread over the surface in sufficient quantity to thoroughly fill the joints. This should be raked so as to remove pebbles and work the sand into joints thoroughly. The pavement should then be thoroughly rammed by one rammer to each two pavers to a firm, unyielding and uniform surface of the form prescribed for the finished roadway. But this first ramming should not approach nearer to the face of the work than 25 feet therefrom. This is necessary to prevent the possible influence of the ramming forcing the face of the work out of line and position.

When a section of pavement covering about 200 feet is completed as just described, it should again be covered with a layer of sand of the same quality and the rammers should again give it a thorough ramming, examining the surface carefully and using their pinch bars to bring into correct line and grade any of the blocks which may be out of place, leaving all courses true in line, all joints thoroughly filled, and the surface perfectly uniform and unyielding. When this is done the paving should be covered with a layer of fine, clean sand, to a depth of  $\frac{1}{2}$  inch. The traffic may then be allowed upon the pavement, but the sand should not be swept off until some two weeks after, so that the settlement of the sand in joints may be made good, and the joints be entirely full when they become thoroughly compacted.

The joints in the paving on a concrete foundation should be filled with gravel which will pass through a sieve of  $\frac{3}{8}$ -inch mesh and will be retained by one of  $\frac{3}{4}$ -inch mesh. It must be free from dust and dirt. In order to insure this it would be best to have it screened off the work. Larger gravel is objectionable for the reason that the large pebbles are likely to wedge the blocks apart and throw them

out of line, while the smaller ones fill up the voids and prevent the cement from flowing.

The gravel should be dried and heated in furnaces standing close to the face of the work, and it must be very hot when put into the joints. The work of filling the joints should be done expeditiously, and should not precede the rammers more than 10 feet. The ramming must be done rapidly and thoroughly, care being taken that all courses are straight in line and even in surface, conforming to the required crown of grade. No ramming must be done within 25 feet of the face of the work.

When the ramming has been completed 10 feet in advance the joints should be scraped or cleaned out with an iron hook, made for the purpose, and freed from all gravel to a depth of 2 inches. The paving composition hereinafter described, heated to a temperature of 300 degs. Fahrenheit, should then be poured into the joints until they are full to the top of the blocks. Hot gravel must then be added until the joints are full and compact and the gravel solidly imbedded to the surface. All work in connection with this jointing must be done with expedition, and sufficient appliances for heating, etc., should be at hand so that there will be no suspension of work until a section is completed. Joints must not be filled with hot gravel and left standing over night or through a rain storm, and if the gravel should get cold from this or any other cause the paving should be relaid.

No carting or driving over the pavement should be allowed until after the jointing is completed.

The paving composition or cement best adapted for joints in pavement over concrete foundation appears to be one of about twenty parts weight of refined asphalt, equal to Trinidad lake asphalt, and three parts of residuum oil mixed with 100 parts of coal tar, known as No. 4. This material should be examined and analyzed before use. It is well also to have the certificate of the manufacturer as to its composition. The materials for the joints must be heated and mixed on the work as they may be required.

A Portland cement grout is sometimes used for joints, but it does not appear to be as satisfactory as the bituminous composition, for the reason that there is no elasticity. It is composed of one part Portland cement and two parts of clean, sharp, screened sand mixed with water to such consistency as to readily flow into the joints. For this kind of work the pavement is rammed and the joints filled with sand. As for pavement on a sand base, the joints are thoroughly cleaned out with an iron hook or tool for that purpose, for one-half the depth of the blocks, and filled with gravel as provided for the bituminous composition; the grout is then poured and swept into them until they are completely filled. No traffic should be allowed on this work until at least one week after completion.

Ex. Ald. McLelland, editor of the St. Catharines Star, has been appointed city clerk of the city of St. Catharines, Ont.

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