

The following are the results obtained from a series of experiments made by students of McGill University, 1895-96:

The object of this first series of experiments is to determine the effect of different per cents of water on the strength of the concrete. The limits were 16 and 30 per cent. of water, by weight of cement and sand, which are beyond the extremes of practice on both sides.

of cement, two of sand, and four of stones, by weight, the proportion of water being based on the weight of sand and cement.

The cement and the sand were first thoroughly mixed dry, then the water added gradually. The stones were then thrown on this mortar, spread out, and the whole vigorously and very thoroughly mixed. The fresh concrete was then placed into the moulds and rammed in 1½ to 2-inch layers.

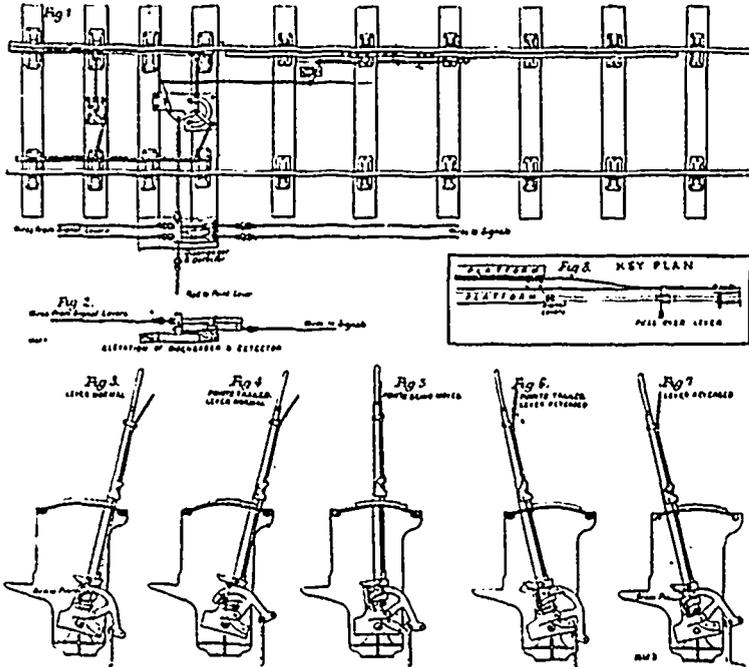


FIG. 8—TRAILABLE FACING POINT LOCKING GEAR.



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CEMENT.

The cement used was, of course, the same brand throughout the series. It was a German Portland of good quality, slow setting, on which separate sand tests were made in connection with this series. The results are tabulated below.

SAND.

This was clean, coarse, angular, dry sand of good quality, of slightly higher grade than usual practice.

STONE.

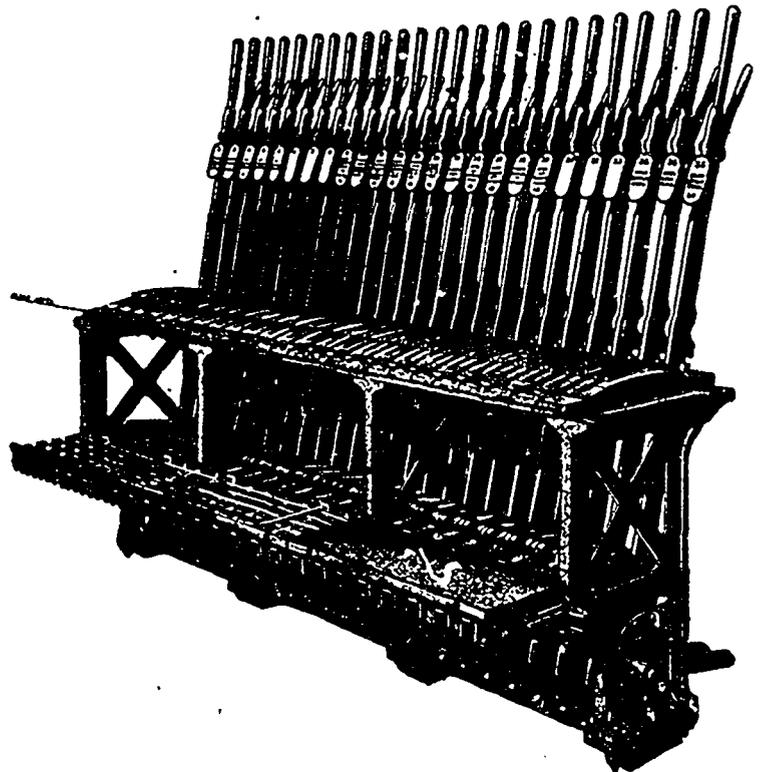
This was broken limestone of such size that the pieces would have passed through a ring 1½-inches diameter. They were unscreened and just as they came out of the breaker. Consequently a slight amount of dust was mixed with them. They had to be broken a little smaller than in actual practice. The blocks of concrete being only one cubic foot, it was thought that more accurate results would be obtained in this way.

MOULDS.

The moulds were made of ¾-inch plank, lined with sheet zinc. They were 5 feet long, 1 foot high and 1 foot wide, divided into four compartments, which would mould four cubes at once, of dimensions 1 x 1 x 1 feet, forming specimens large enough to investigate seriously upon. These were removed by unscrewing one side of the box and sliding them out. Care had to be taken to oil the sides of the moulds slightly before ramming the mixture in them, to avoid trouble in getting them out.

CONDITIONS OF MIXTURE AND PROPORTIONS.

The proportions adopted for this series were one



LOCKING APPARATUS, UNION STATION.

RAMMING.

The rammer was a block of hard wood 2 feet long by 2 x 2 inches, with a lathe turned handle. It was not very easy with this to ram uniformly, even throughout one block, and this is one of the main sources of discrepancies in this series of experiments.

It was thought that a reduction of the breaking loads to a standard weight of the blocks would be only fair, and would slightly improve the results.

GROUPING OF TESTS.

The tests were made at one week, four weeks, and