The casting of the top is usually a standard manhole frame and cover made to fit on the tile by corbeling up with brick.

This type of track box has given satisfaction with the exception of the grill, of which a large number of the old type were found with one or more bars broken off by the traffic. In making a new design it was decided to lay the grill lengthwise along the rail, thus greatly increasing the inlet capacity. Fig. 13 shows a section of the new type in use since 1915.

Track Base

There are a great variety of methods of transmitting the loading of the rail to the subgrade below, but generally speaking they may be divided into: (1) Girder type; (2) slab construction; (3) ballast base construction; and (4) monolithic concrete construction.

The girder type of track work carries its load on a continuous concrete girder underneath the rail, with a cross girder under each tie. The pavement base is poured at the same time as the girders, but where the rails are 7 ins. or less, it cannot be expected that this thin slab will carry a part of the loading. Steel ties are invariably used with the girder construction, and placed from 6 to 10 ft. apart, serving only as tie rods in holding the rails to gauge, but taking very little part in supporting the load.

The slab construction carries its load on a 6 or 8-in. concrete base, extending the entire width of the track, which may be brought to grade by using a light sand cushion, or by shimming up the ties with wooden wedges and pouring a weak concrete filler or placing a 4 or 5-in. layer of rock ballast around and under the ties.

In the case of ballast base construction, the load is carried on a 6 to 10-in. gravel or crushed rock base which extends well out at each end of the ties. Some railway companies lay a ballast base but bring the concrete which supports the pavement down under the base of the rail, thus making a combination girder and ballast construction.

The monolithic concrete construction, as the name implies, is poured in one operation. It carries its load, however, in much the same way as the slab construction, the concrete under the slabs varying from 6 to 8 ins. in depth.

Track Pavement

In Alberta, where local clay does not make a paving brick, and where there is no granite to be obtained, the choice of a pavement is restricted to materials that may be shipped at a reasonable cost, or to local materials. The selection is limited to wood block, bituminous pavement, concrete, or some combination of two or more of these materials. A description of each class of pavement will be included in the following resumé of the different types of track work laid in Edmonton:—

TABLE 1—DIMENSIONS AND WEIGHTS, GROOVED RAIL SECTION (SEE FIG. 6)

h	b	d	a	e	f	g	k	t	Wt. per Yd., Lbs.	Tons per Mile, Single Track.
3 1/2″	4″	2 5/32″	3 13/16″	1 9/32″	3/8″	7/8″	0	3/8″	55	86.43
6″	6″	1 27/32″	3 3/8″	1 5/32″	3/8″	1″	1/8″	5/16″	74	116.29
6″	5 1/2″	1 59/64″	3 15/32″	1 1/32″	33/64″	1 7/32″	1/8″	3/8″	80	125.71
6″	6″	2 1/8″	3 15/16″	1 3/16″	5/8″	1 1/32″	3/16″	3/8″	85	133.57
6 1/2″	5 3/4″	1 7/8″	3 9/16″	1 1/16″	5/8″	1 1/8″	1/8″	15/32″	90	141.43
6 1/2″	6 1/2″	1 31/32″	3 7/8″	1 15/64″	39/64″	1 1/16″	1/8″	7/16″	95	149.29
6 1/2″	7″	1 15/16″	3 9/16″	1 1/8″	1/2″	1 1/8″	1/8″	14/32″	95	149.29
6 1/2″	7″	2″	3 11/16″	1 1/8″	9/16″	1 1/8″	1/8″	7/16″	100	157.14
7″	7″	2 1/8″	3 13/16″	1 1/8″	9/16″	1 1/8″	1/8″	9/16″	105	165.00
7″	7″	2 1/4″	3 31/32″	1 1/2″	19/32″	1 1/8″	1/8″	29/64″	110	172.86

Jasper Avenue Track Work

The first permanent street railway tracks in the city of Edmonton were laid on Jasper Avenue, between 101st Street and 109th Street, in 1907. Fig. 7 is a cross-section through this construction. The section is a girder type, having a 13-in. bearing at the bottom of the girder, with a depth of 9 ins. under the base of the rail. The rails are held together every 10 ft. with 40-lb. inverted steel ties, fastened to the flange of the rail with bolts and clips. Each cross-tie is supported by a cross-girder 6 ins. deep. Sixty-foot 7-in. 80-lb. Lorain section rails were used, and heavy Atlas joints, which were bolted to the web with sides well up under the head, and with the lower part of the joint carried under the flange, where it acts as a girder in supporting the joint.

Concrete was poured to within 4 ins. of the top of the rail and allowed to set. A wood block pavement was laid down between the gauge lines and in the devil strip, the blocks next to the rail on the outside being kept vertical by the use of a treated wooden filler strip laid against the web, while the blocks laid on the gauge side of the rail were notched to allow for the wheel flange clearance.

After two years of comparatively light traffic, it became apparent that the wood blocks between the gauge lines would not stay down. The flange of the wheels first split the blocks, and as dirt and water were forced into the cut, the blocks arched up until they caught on the fenders of the car.

During 1910, all wood blocks were removed from between the gauge lines and replaced by a reinforced concrete rail stretcher, with a 2-in. bituminous surface between the stretchers. Fig. 7 shows a detail of this reconstruction. The surface of the existing concrete was carefully cleaned off with steel brooms and a rich concrete rail block, 6-ins. wide and 4-ins. deep, was laid at the gauge side of each rail, and before the initial set had taken place the intervening space was poured with concrete mixed in the proportion of 1 part cement, 2 parts sand and 5 parts washed gravel or crushed rock. Strips of expanded metal were placed in the rail block, with one end embedded in the pavement base. After sufficient time had elapsed for the concrete to set, the 2-in. bituminous surface was laid.

TABLE 2—DIMENSIONS AND WEIGHTS, TRILBY RAIL SECTION (SEE FIG. 6)

h	b	d	a	e	f	g	k	t	Wt. per Yd., Lbs.	Tons per Mile, Single Track.
6 7/8″	6″	1 31/32″	4 1/8″	1 19/32″	9/16″	1 1/8″	1/4″	3/8″	87	136.71
7″	6″	2 1/4″	4 7/8″	1 5/16″	1 5/16″	1 1/8″	1/4″	3/8″	90	141.43
7″	6″	2 1/2″	4 11/16″	(e+f=2 3/16″)		1 1/4″	1/8″	7/16″	102	160.29
7″	6″	2 1/2″	5 1/8″	2″	5/8″	1 3/16″	1/8″	7/16″	105	165.00
7″	5″	2 1/4″	5 1/4″	1 37/64″	1 27/64″	1 1/8″	1/8″	9/16″	110	172.86
8″	5 1/2″	2 1/8″	5 3/16″	1 9/16″	1″	1 1/8″	5/32″	7/16″	104	163.43
9″	5 1/2″	2 1/4″	5 1/4″	1 35/64″	1 29/64″	1 1/8″	5/32″	7/16″	109	171.29
9″	5 1/4″	2 1/4″	5 1/4″	1 37/64″	1 27/64″	1 1/8″	1/8″	1/2″	115	180.71
9″	5 1/2″	2 1/4″	5 7/8″	(e+f=2 7/8″)		1 1/2″	13/32″	7/16″	125	196.43
9″	6 1/2″	2 3/8″	6″	2 7/16″	1 3/4″	1 5/16″	13/32″	9/16″	140	220.00

When the track on Jasper Avenue had been subjected to heavy traffic for 4 years, it became evident that the girder would not hold. The joints settled first, followed by other portions, and in 1915 it was found necessary to replace several hundred feet of the worst parts by a later design. In 1916 most of the pavement was removed and the joints blocked up.

From the fact that this kind of construction carried a fairly heavy traffic for 4 or 5 years on a partially saturated subgrade, it would seem reasonable to expect that for moderate traffic on a well drained subsoil such as gravel or coarse sand, this type would give satisfaction. In connection with the two rows of wood blocks, which insulated the bituminous pavement from the rail, it was a noticeable feature to see the block next to the soil follow the rail down 2 or 3 ins. as the girder sank, while the other block remained intact with the surface,—the two blocks sliding on each other.

Namayo Avenue Track Work

The next type to be constructed was on Namayo Ave. The loading was carried on two concrete girders, and the rails were held together by tamarac ties spaced at 2-ft. centres (see Fig. 8). The rails used were 5-in. 80-lb. A.S. C.E. sections, held together by continuous joints. After the trenches had been excavated, the skeleton track was blocked up and the base poured. In this case the track pavement was a two-course concrete slab, and it was possible to pour the track base and paving base in one operation. The top surface was added before the base had taken its initial set.