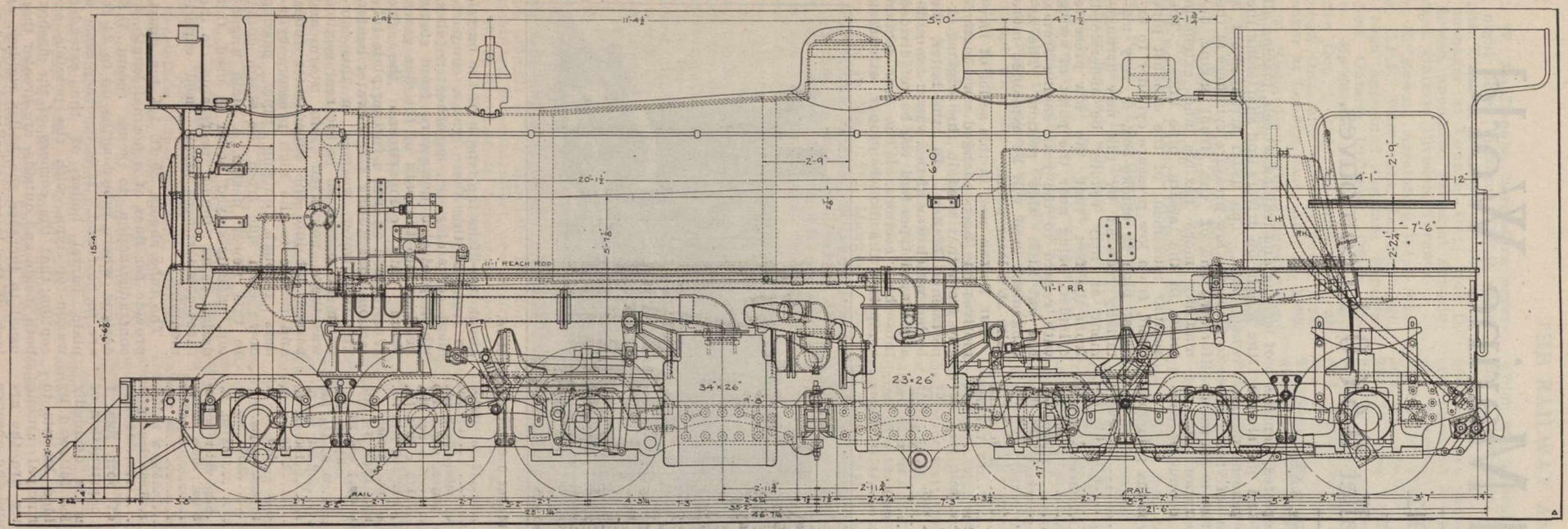

Fig. 2—Elevation of Canadian Pacific Railway Mallet 0-6-6-0 Locomotive.

sponsible for staybolt breakage in the end rows.

The feed-water heater and superheater chamber being eliminated, a superheater of the Vaughan-Horsey type is placed in the smoke-box, the arrangement of headers, etc., being noted in the elevation drawing, fig. 2. The injector check valve is located on the top centre line of the boiler, under the bell stand, and has three connections—one for the left and another for the right hand injectors, and a third for connection with pipe or hose coupling for use in filling or blowing off the boiler.

Instead of placing both sand boxes on top of the boiler as in the former design, one of them is located in the upper forward part of the smoke-box, feeders leading down on the inside of the smoke-box shell. The box is filled through a small door on the top.

The experimental locomotive had a double petticoat smoke stack. In the new design this has been eliminated and a single wide-flare stack introduced in its place.

FRAME, CONNECTIONS AND SPRING RIGGING.—The frames for each engine are one-piece steel castings, slabbed for the cylinder fit, and also for the front bumper and back foot-plate. The sections of both top and bottom rails of the frames are 4½ ins. wide by 4½ ins. deep and 4½ ins. wide by 3 ins. deep respectively.

The only feature of particular importance about the frames lies in the manner of connection between the front and rear engines. In the experimental locomotive a plain pin connection at the point of juncture of the two connecting castings served as the means of connection. This pin was in triple shear when pulling, but was relieved of all strain when pushing, by the design of the connecting castings being such as to have corresponding contact faces, taking up all thrust independently of the pin.

The new method of frame connection is clearly shown in fig. 3, a plan view of the immediate vicinity of the connection. Essentially, the connection is similar to that between engine and tender, a built-up plate drawbar, 9 ft. 8 ins. long, as shown in the illustration, being used. This connecting drawbar is pin-connected at the rear end of the cross-bracing castings between the cylinders. The faces of the castings, where they come in close proximity to each other at the inner ends, have a curved surface, with a radius to the centre of the drawbar pin. A concaved casting with similar curved surfaces acts as a filler, permitting a rolling motion between the front and rear engines when rounding curves. That is to say, the intervening piece so adjusts itself as the engine takes a curve that its centre is always in a line joining the two drawbar centres. This arrangement maintains a close alignment between front and rear sections, eliminating all play.

The drawbar was so designed as regards length that as the adjacent ends of the frames move outward when taking a curve, the centre of the drawbar is always in the centre line of movement, i.e., directly over the centre of the track, keeping the push or pull where desired, and overcoming the difficulties that would be experienced from side thrusts were the connections as in the original design.

Centring rods, to maintain the relative location of front and rear engines with regard to each other, are attached, one on each side of the connecting casting of the rear engine, these being attached by pins at the centre to the connecting casting of the front engine, as shown in fig. 3. The relative positions being thus maintained, the intervening distance casting has no tendency to jam in place.

When pulling, the front part of the forward engine of a Mallet has a tendency to lift, this condition being reversed when the engine is pushing. In this new design this undesirable feature is taken care of by means of bolts carrying compression springs passing down from lugs on the upper surface of the connecting casting of the back truck to similar lugs on the lower surface of the connecting casting of the front truck as indicated both in fig. 3, and at the point of connection in fig. 2. Thus, the connecting casting of the rear frame, through its bolts, carries the rear end of the forward frame when the front of the latter tends to rise, with a consequent depression of the rear end. The springs, mounted on the carrying bolts, absorb any quick fluctuations that may occur.

The spring rigging is of the usual type, equalized from front to rear on each truck. The forward engine has a cross equalizer at the front, but the rear engine is merely equalized along the sides.

CYLINDERS AND MOTION WORK.—Both pairs of cylinders are of the piston valve type, with inside admission on the high, and outside on the low pressure engines. They are decidedly unique, forming a radical departure from the practice heretofore followed in Canada. The low pressure cylinder, being typical of both, is shown in fig. 4.

The point of particular change lies in the fact that the cylinders are made of cast steel, lined with cast-iron bushings. Making them of steel saves a weight of no less than 6,000 lbs., which is a very important factor where weight elimination to obtain greater steaming capacity is desired. An examination will show how extremely light in construction the cylinder is, the shell being only ⅝ in. in thickness, with a corresponding high pressure thickness.

The cylinders are cast separately, divided at the centre line as usual. In the case of the high pressure cylinder, there is a cast-steel saddle common to