

er. The back tank itself is also built down to the frame and secured to it by two 3 x 3 x $\frac{3}{8}$ in. steel angles, and, as the bottom of the tank is supported by two crossbars of 5-16 in. steel plate the whole construction is exceedingly rigid.

THE BOILER is of the extended wagon top type with medium width firebox. There are 173 2 in. flues and 22 5 in., 13 ft. 9 $\frac{3}{8}$ in. long. All of the side stays underneath the front tanks are flexible and a new system of cross braces for the roof sheet has been used. There are 8 of these, 1 $\frac{1}{2}$ in. diameter, connected to the roof sheet by 5 x 3 in. tees, and they are so located as to prevent bulging of the roof, which reaches a maximum at a point just above the crown. The boiler, although not of the wide firebox type, has ample capacity to supply steam to the cylinders at any speed. This is shown by the B.D. factor (tractive effort \times diameter driving wheels), which is equivalent heating surface, 753, or well within the limits of good practice.

THE CYLINDERS AND VALVE GEAR are of the inside admission piston valve type, with the valve chambers cast inside the main frames. This necessitates a rocker at the front end to transfer the line of motion from the radius bar on the outside of the driving wheels to the valve stem inside the frames. The front cylin-

der heads are of cast steel and the back cast iron, lugged for alligator type guide bars. The valve gear is of the Walschaert type, and the details are of the C.P.R. Co.'s usual construction, except that they have been made lighter than any previously used on this road. Two 3 in. vacuum relief valves are used connecting to each steam chest.

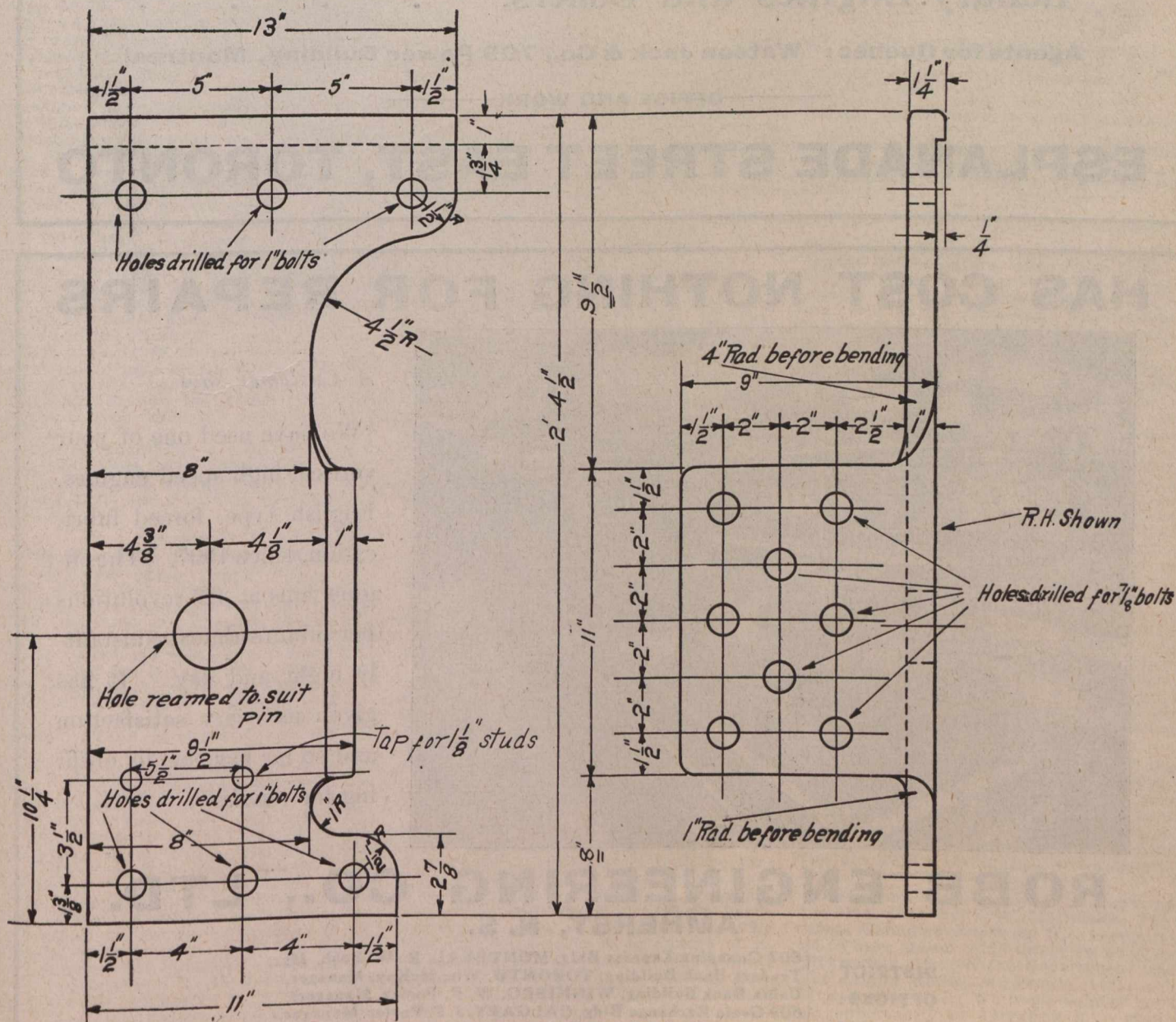
SPRING RIGGING.—The engine is equalized from the front truck to the back driver with equalizers on each side of the front truck. The back truck takes its weight direct from the frame and in this way the points of support are as though the engine had four pairs of driving wheels equalized together and a four-wheel centre pin leading truck. Both trucks, although of the four-wheel type, have radius bars, and the length of these bars has been determined with a view of making the rear wheels do some of the guiding and relieve the front wheels of excessive flange wear. This is best explained by referring to the diagram, which shows the wheel base of the locomotive, on a 15° curve, and the lengths of the radius bars are such that when taking a curve the front flange bears against the outside rail and the rear flange on the same side is also brought close to it instead of the outside leading and inside back flanges bearing as is usual with

trucks of this type. Side movement of the trucks has been provided for by a system of slides having an incline of $1\frac{1}{4}$ in. in 10 in. These inclines have a centering effect of 8,100 lbs. and work in an oil bath formed by flanges on the supporting cross-tie on the truck; in this way uneven wear should be prevented. The truck radius bar and driving equalization systems present a novel and interesting arrangement, but the results obtained in service more than justify the innovation.

THE ASHPAN is of the usual plate construction and has liberal aid spaces under the firebox ring. It is fully protected against fire throwing by an inside deflector plate extending down past the air openings.

The injector check is of the latest C.P.R. type located on top of the boiler 30 in. back of the flue sheet and is placed underneath the bell stand. The check casting proper combines the R. & L. injectors and also has a connection for a blow-off pipe. An inside deflector plate serves to distribute the water after entering the boiler.

DRIVING WHEELS, RODS AND BOXES.—The driving wheel centres are of cast steel with pear section spokes and arch section rims; cast iron hub liners are let into and studded to the hubs. These run



C.P.R. Suburban Tank Locomotive. Frame details, Expansion Plate Bracket.