

as in the former classes. The tender brakes are arranged to work either with the Westinghouse air-brake or with the American steam-brake or by hand. The weight of the tender when empty is 35,000 lbs., and when fully loaded 85,000 lbs.

S. G. Mogul Engines.—The term "Mogul" is applied to such engines as have a two-wheeled truck in front of the cylinders and three pairs of coupled drivers behind. The author is now engaged in working out the details of a class of Mogul engines with 19×24 inch cylinders, as shown in outline in Fig. 12, designed for fast freight service in summer on the heavier sections of the road, and for heavy fast passenger service in severe winter weather. The lines of the S. D. class (page 22) have been followed to a great extent, in order to obtain the requisite boiler power; and duplication of parts of former classes is also closely adhered to, not a single new pattern being required.

The boiler is similar to that of the S. D. class, the same flange blocks being used; it is somewhat shorter in the barrel, but its centre is the same height above the rails, namely 7 ft. 3 ins., though the wheels are increased from 51 ins. to 62 ins. diameter. The bottom of the firebox is made shallower at the back end, to clear the trailing axle-boxes; while the front end is kept to the full depth, to allow sufficient depth of fire below the bottom tubes. The frame is similar to that of the S. D. class, but with three pairs of horns; between the driving and trailing wheels it is forged down to suit the firebox, thereby enabling the boiler centre to be kept to 7 ft. 3 ins. height, although driving wheels of 11 ins. greater diameter are used. The cylinders are made from the S. D. pattern, but lengthened in stroke to 24 ins., and made shallower in the boiler seat. Other duplicates of the S. D. class are the truck, buffer-beam, pilot, crosshead, crank-pins, spring saddles, details of spring gear, side-rod brasses, motion plate, back beams, drag box, cab, details of grate and shaker, chimney, exhaust and steam pipes, regulator and handle, steam-chest cover and hopper.

Duplicates of the S. B. class are the connecting-rod, piston and rod, valve buckle, eccentrics and straps, details of motion, rocker box, smoke-box front and door.