It then at length became an accomplished fact at Coalbrookdale Ironworks in Shropshire. The success was at first ascribed to the Shropshire coal, but probably the employment of a strong blast had a great deal to do with it. From this the coal became the life of the iron manufacture. The *ci-devant* drooping trade rapidly revived, and the latter part of the eighteenth century saw coal iron furnaces in successful operation throughout the kingdom.—*Contemporary Review.*

AMERICAN AND ENGLISH LOCOMOTIVES.

(*Continued from page* 420.)

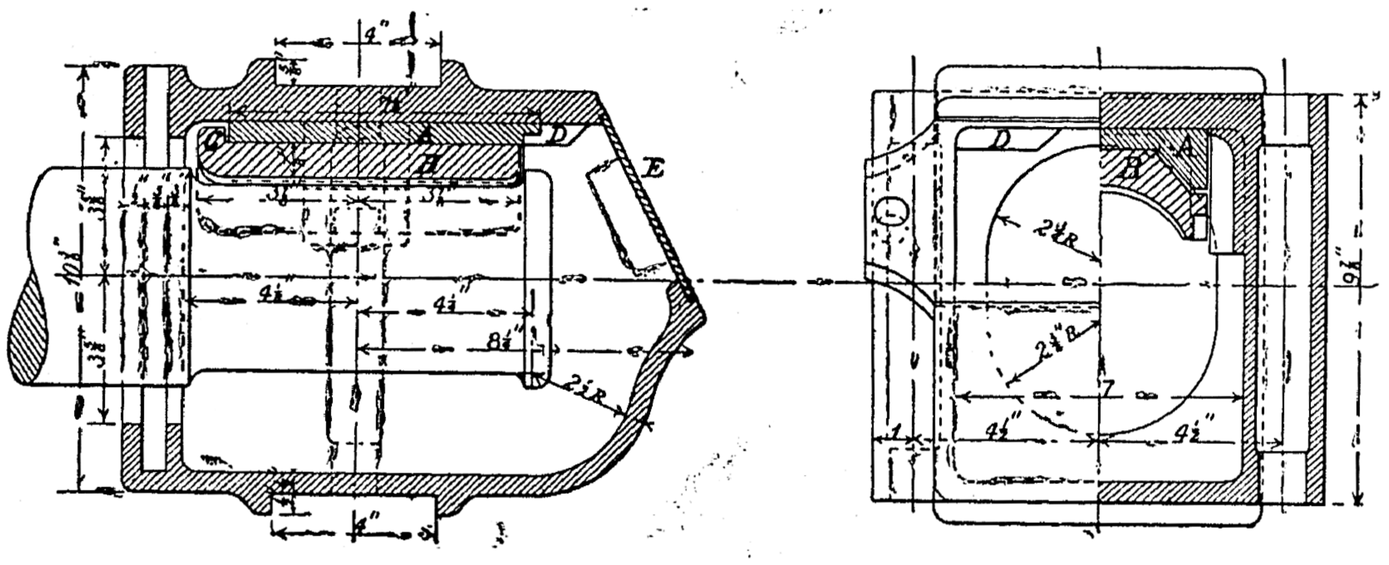
THE parts of the locomotives which are illustrated this month are the tender frames and running-gear, of which the following are the specifications for the American engine :

TENDER FRAME.

Substantially built of $6\frac{1}{2} \times 4\frac{1}{4}$ in. angle iron and thoroughly braced. The back end to be fitted with "Gould" coupler.

TENDER TRUCKS.

Two four-wheeled side bearing trucks made with wrought-iron side-bars and wood bolsters.



TENDER OIL-BOX FOR AMERICAN EXPRESS PASSENGER LOCOMOTIVE.

SPRINGS.

Made of best cast steel, tempered in oil.

WHEELS.

Krupp's steel-tired plate wheels, 36 in. diameter. Tires held by retaining rings.

AXLES.

Of hammered iron, with outside journals $4\frac{1}{2}$ in. diameter and 8 in. long. Brakes on front truck only.

The specifications for the corresponding parts of the English engine are as follows :

SIX-WHEELED TENDER.

Principal Dimensions.

	Ft.	In.
Diameter of wheels on tread	3	$9\frac{3}{4}$
Center to center of journals	6	6
Length of journal	0	9
Diameter " "	0	$5\frac{1}{4}$
Diameter of axle in wheel	0	$6\frac{3}{4}$
" " " at center	0	$6\frac{1}{4}$
Wheel-base	13	0
Length of frame	19	$9\frac{1}{2}$
Total length of wheel-base, from center of leading bogie wheels of engine to center of hind wheels of tender	44	$3\frac{1}{8}$
Length over all, from front buffers of engine to hind buffers of tender	53	$8\frac{3}{8}$
Height of center of buffers from rails	3	5

TENDER FRAME.

The frame-plates, cross-stays, stretcher-plates, hind buffer-plates to be of steel, same quality and manufacture in every respect as specified for the engine main frames.

Each frame is to be made of one plate, $\frac{7}{8}$ in. thick, and all holes are to be marked and drilled from one template. The axle-box guides are to be made of cast iron, planed, fitted, bolted to frame, and must be free from cross-winding and square with the frames in all directions. The horn-stays are each to consist of two $1\frac{1}{8}$ in. bolts with cast-iron distance pieces accurately fitted between the horns. All the cross-stays are to be accurately fitted to the frames and riveted to them by $\frac{3}{4}$-in. diameter rivets. The frames are to be accurately tested by longitudinal, transverse and diagonal measurement, and must be perfectly parallel to each other. The front buffing and draw-beam is to be constructed as shown, and is to be provided with buffers fitted with volute springs to this company's pattern. The draw-bar is to be forged in one, the hole at one end being punched. Wrought-iron steps are to be provided, roughed and fixed where shown. The hind buffing and draw-plate is to have a draw-hook and bar furnished with one of Spencer's No. 6 india-rubber cylinder to this company's pattern, two cast-iron buffers the same as specified for the engine, two side chains and screw coupling made of best chain cable iron, and to drawing. Two steel life-guards are to be bolted to the frame, behind the hind wheels.

AXLE-BOXES.

The axle-boxes are to be made of cast iron fitted with a wrought-iron top, and with the best gun metal bearings lined with Dewrance's anti-friction metal, and to have cast-iron keeps provided with lubricating pads. The axle-box bearings to be $\frac{1}{16}$ in. shorter than the axle-journal to give clearance ; front and hind axle-boxes must have $\frac{1}{8}$ in. side play, and the center axle-box $\frac{1}{4}$ in. side play on each side of the guides, as shown in drawing.

SPRINGS.

Tender springs to be same quality, workmanship and manufacture as specified for the engine springs. Each spring to consist of 16 plates, one plate $\frac{1}{2}$ in. thick and 15 plates $\frac{7}{16}$ in. thick to a span of 4 ft., each spring to be provided with hangers at the ends and buckles in the center, as shown. Each spring to be tested with a weight of 8 tons, and must resume its original form after testing.

WHEEL-CENTERS.

The wheel-centers to be of good sound cast steel of approved make, quality, and manufacture, and tests same as specified for engine. Each wheel-center to be turned to a diameter of 3 ft. $3\frac{3}{4}$ in.; the rims are to be $4\frac{7}{8}$ in. broad, $2\frac{5}{8}$ in. thick at center, to have 10 spokes $2\frac{1}{8}$ in. thick at the boss and 4 in. deep ; at the rims $1\frac{3}{4}$ in. thick and $3\frac{1}{4}$ in. deep. The bosses are to be bored out parallel to a diameter of $6\frac{3}{4}$ in., and are to be $11\frac{3}{4}$ in. diameter. All the centers must be bored and turned strictly to template, so that they shall be exactly alike, and each wheel-center must be forced on the axle by a hydraulic pressure of not less than 70 tons. The wheel-centers are to be fixed to the axles without keys.

TIRES.

The tires to be 3 ft. $9\frac{3}{4}$ in. diameter on tread, and in every other respect to be same as the engine tires, both as regards section, quality of material, and workmanship, and to be manufactured by Vickers & Company. The same tests to be applied as for the engine tires.

AXLES.

Each axle must be made of the very best cast steel, quality and tests as specified for the engine axles, and to be manufactured by Vickers & Company. Centers of journals to be 6 ft. 6 in., diameter, $5\frac{1}{4}$ in., and length, 9 in.; other dimensions as shown in drawings.