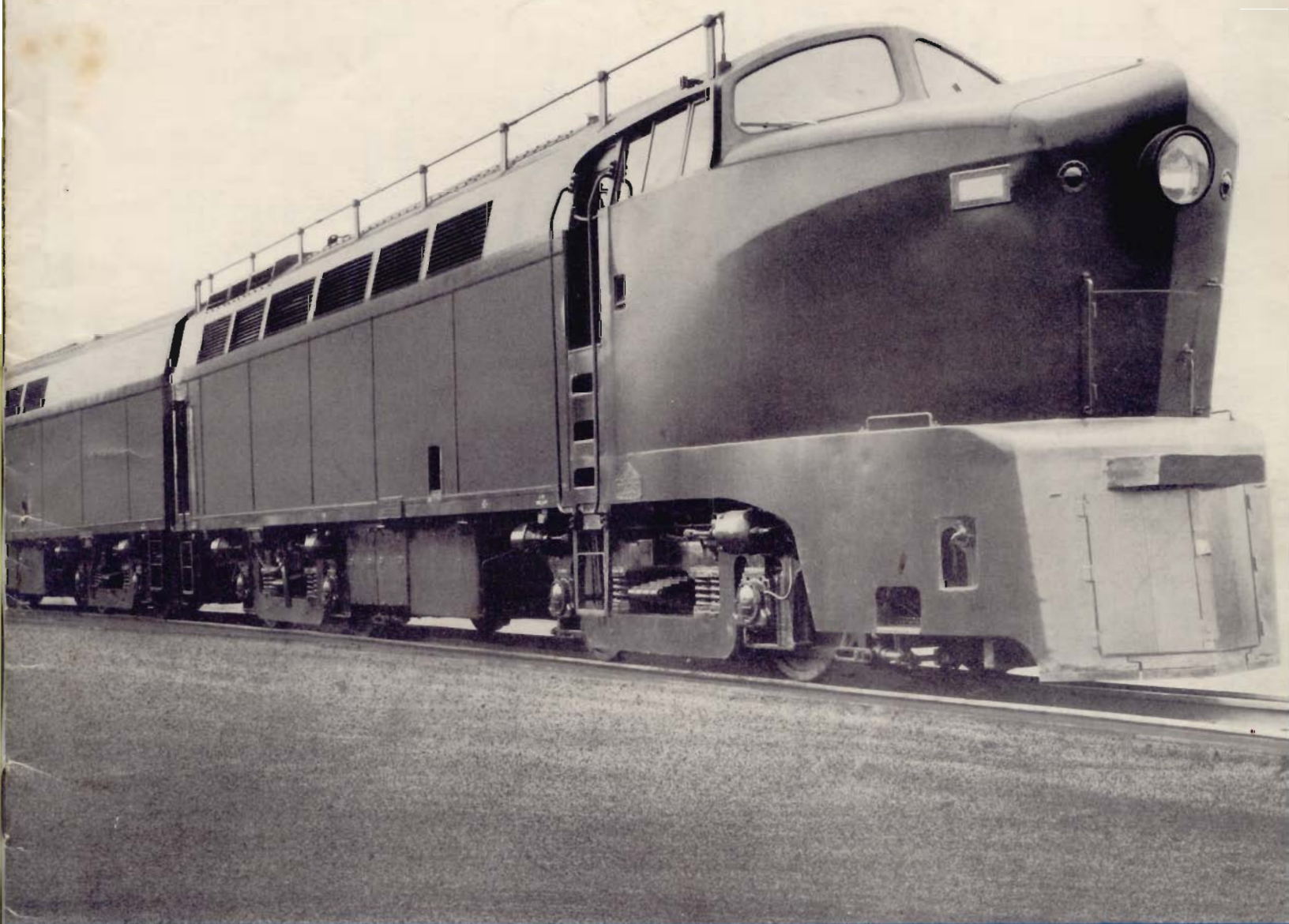


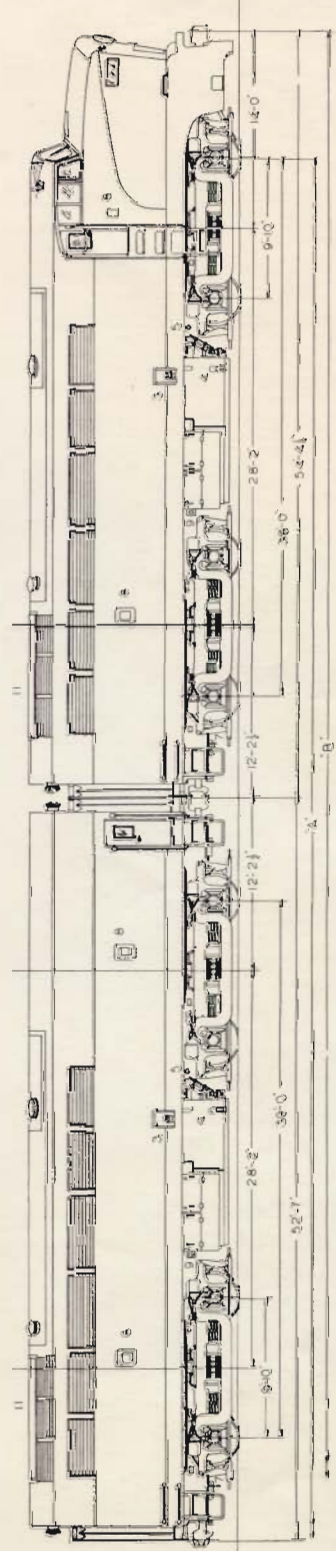
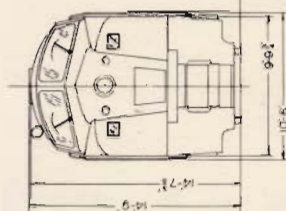
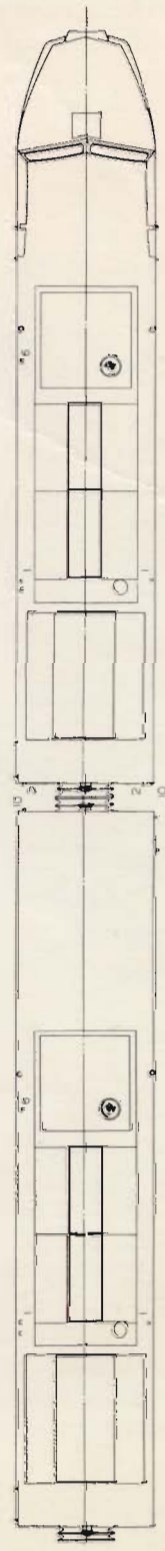
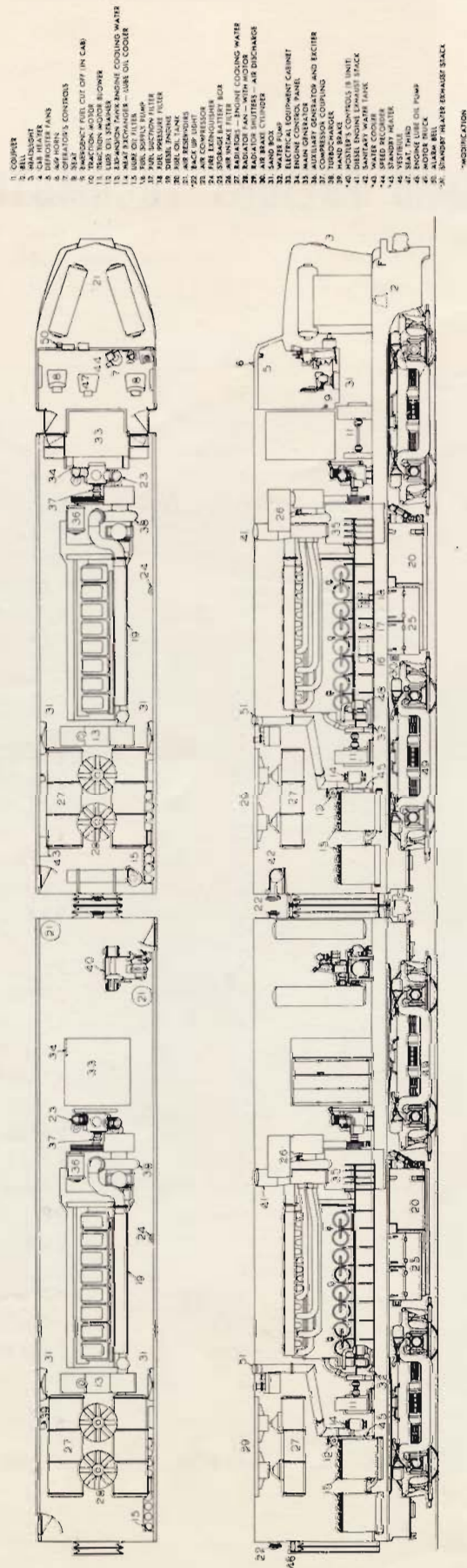
6000 H.P. DIESEL ELECTRIC ROAD FREIGHT LOCOMOTIVE



THE BALDWIN LOCOMOTIVE WORKS

PHILADELPHIA 42, PA.

LOCATION OF PRINCIPAL PARTS



| | A | B |
|------------------|---------|----------|
| 2 UNIT (2A) | 90' 7" | 108' 9" |
| 3 UNIT (2A + 1B) | 145' 5" | 178' 4" |
| 4 UNIT (2A + 2B) | 195' 9" | 243' 11" |

— DIESEL ELECTRIC LOCOMOTIVE —
1500 H.P. A-UNIT
1500 H.P. B-UNIT
THE BALDWIN LOCOMOTIVE WORKS
DESIGN 98-6-260 AND 261

THE BALDWIN LOCOMOTIVE WORKS

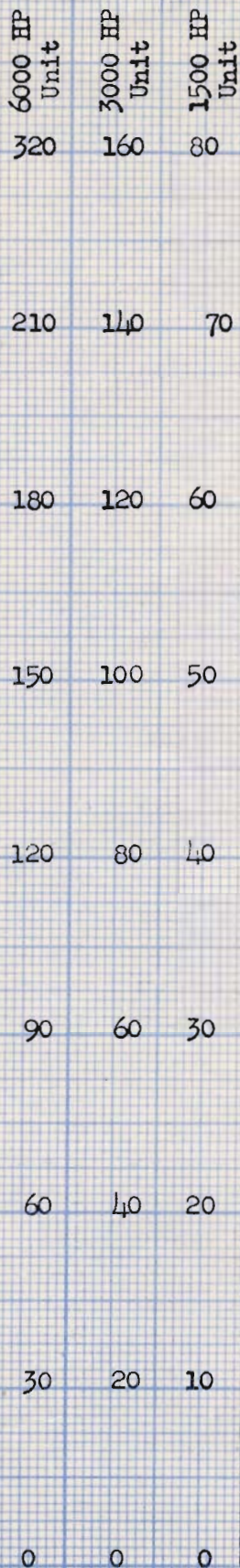
DIESEL ELECTRIC ROAD FREIGHT LOCOMOTIVE • 6000 H. P. DEMONSTRATOR

GENERAL CHARACTERISTICS

| | | A—Unit | B—Unit | 6000 HP Loco. |
|----------------------------------|-----------------------|----------------|----------------|-----------------|
| DIESEL ENGINE | Supercharged | One 8 Cyl. | One 8 Cyl. | Four 8 Cyl. |
| | HP for Traction | 1500 | 1500 | 6000 |
| SUPERCHARGER | | Turbo Type | Turbo Type | Turbo Type |
| DRIVING MOTORS | Number | 4 | 4 | 16 |
| | Type | 370 | 370 | 370 |
| JOURNAL BEARINGS | Type | Roller Brg. | Roller Brg. | Roller Brg. |
| | Size | 6½" x 12" | 6½" x 12" | 6½" x 12" |
| WHEELS | Driving | 4 Pairs | 4 Pairs | 16 Pairs |
| | Idling | None | None | None |
| | Diameter | 42" | 42" | 42" |
| RUNNING GEAR | Swivel Trucks | Swing Bolster | Swing Bolster | Swing Bolster |
| WHEEL BASE | Ea. Driving Truck | 9' 10" | 9' 10" | 9' 10" |
| | Total | 38' 0" | 38' 0" | 195' 9" |
| TOTAL WEIGHT (Approximate) | In Working Order | 263,000 | 256,000 | 1,038,000 |
| | On Drivers | 263,000 | 256,000 | 1,038,000 |
| | Light | 249,000 | 242,000 | 982,000 |
| | Front Truck (At Rail) | 128,000 | 124,000 | |
| | Rear Truck (At Rail) | 135,000 | 132,000 | |
| MAXIMUM OVERALL DIMENSIONS ... | Width | 10' 6" | 10' 6" | 10' 6" |
| | Height | 14' 10½" | 14' 10½" | 14' 10½" |
| | Length | 54' 4½" | 52' 7" | 213' 11" |
| MINIMUM RADIUS CURVATURE | Loco. with Train | 273' (21°) | 273' (21°) | 273' (21°) |
| SUPPLIES | Lube Oil | 200 Gals. | 200 Gals. | 800 Gals. |
| | Fuel Oil | 1200 Gals. | 1200 Gals. | 4800 Gals. |
| | Cooling Water | 300 Gals. | 300 Gals. | 1200 Gals. |
| | Sand | 20 Cu. Ft. | 20 Cu. Ft. | 80 Cu. Ft. |
| | Air Capacity | 34,800 Cu. In. | 34,800 Cu. In. | 139,200 Cu. In. |
| GEAR RATIO | | 15:63 | 15:63 | 15:63 |
| STARTING TRACTIVE EFFORT | 25% Adhesion | 65,750 Lbs. | 64,000 Lbs. | 259,500 Lbs. |
| CONTINUOUS RATING T.E. | | 42,800 Lbs. | 42,800 Lbs. | 171,200 Lbs. |
| CONTINUOUS RATING SPEED | | 10.5 MPH | 10.5 MPH | 10.5 MPH |
| MAXIMUM SAFE SPEED | | 65 MPH | 65 MPH | 65 MPH |
| PERFORMANCE | | 94087 | 94087 | 94087 |
| TONNAGE RATINGS | | | | 94086 |
| CLEARANCE DIAGRAM | | 94088 | 94088 | 94088 |
| DESIGN—A & B UNITS | (Exterior) | 98-6-260 | 98-6-260 | 98-6-260 |
| DESIGN—A & B UNITS | (Interior) | 98-6-261 | 98-6-261 | 98-6-261 |
| AIR BRAKE SCHEDULE | | 24 RL | | 24 RL |
| AIR COMPRESSOR | 3 Cyl., 2 stage | 1 | 1 | 4 |
| BRAKE FOUNDATION | Clasp Type | All Wheels | All Wheels | All Wheels |
| BRAKING RATIO | 50 lbs. cyl. pres. | 75% | 75% | 75% |
| BRAKE, HAND | Lever Type | One Truck | One Truck | Four Trucks |
| BLOWERS | Mech. Driven | 2 | 2 | 8 |
| DYNAMIC BRAKING* | All Units | | | |
| RADIATOR FANS | Motor Driven | 2 | 2 | 8 |
| TRUCK WEIGHT | Each | 42,000 | 42,000 | 42,000 |

*Modification

Tractive Effort - Thousands of Pounds



THE BALDWIN LOCOMOTIVE WORKS

Diesel Electric Locomotive
Speed Tractive Effort Curve

Approximate

1500 HP For Traction

1-471 Generator

4-370 Traction Motors

15:63 Gear Ratio

42" Diameter Wheels

Continuous Rating

TRAILING TONNAGE RATINGS

6000 HP for Traction
42" Diameter Wheels
16-370 Traction Motors
4-471 Generator

15:63 Gear Ratio
500 Ton Locomotive
50 Ton Cars — Freight
Tangent Track — Sea Level
Davis Formula Resistances

Starting tonnage based on 12#/ton starting and acceleration resistance, 25% adhesion, and corresponding grade resistance. Short time and continuous rating tonnages based on rolling resistance and corresponding grade resistance but limited to starting tonnage on level grade.

| Grade % | Start | SHORT TIME RATING (AFTER 15-MIN. COOLING PERIOD) | | | | CONTINUOUS RATING MPH | | | | | |
|---------|-------|---|------------------------------|-------------------------------|-------------------------------|--------------------------|-------|-------|------|------|------|
| | | ½ Mile or Less 6.6 MPH | 1 Mile or Less 6.9 MPH | 2 Miles or Less 8.1 MPH | 3 Miles or Less 8.8 MPH | Max. Cont. 10.5 | 20 | 30 | 40 | 50 | 60 |
| 0 | 20340 | 20340 | 20340 | 20340 | 20340 | 20340 | 19060 | 10320 | 6260 | 4080 | 2420 |
| .1 | 17300 | 20340 | 20340 | 20340 | 20340 | 20340 | 13380 | 7550 | 4720 | 3160 | 1920 |
| .2 | 15120 | 20340 | 20340 | 20340 | 20340 | 20340 | 10260 | 5860 | 3760 | 2560 | 1560 |
| .3 | 13380 | 20340 | 20340 | 20340 | 19360 | 16320 | 8280 | 4760 | 3080 | 2120 | 1300 |
| .4 | 12000 | 20340 | 19820 | 17360 | 16080 | 13560 | 6220 | 4000 | 2600 | 1800 | 1080 |
| .5 | 10860 | 17500 | 17000 | 14820 | 13740 | 11600 | 5920 | 3420 | 2240 | 1540 | 920 |
| .6 | 9920 | 15240 | 14720 | 12900 | 11960 | 10100 | 5180 | 2980 | 1920 | 1320 | 780 |
| .7 | 9120 | 13480 | 13020 | 11420 | 10580 | 8920 | 4560 | 2620 | 1740 | 1200 | 680 |
| .8 | 8400 | 12080 | 11660 | 10240 | 9480 | 8000 | 4080 | 2340 | 1520 | 1040 | 580 |
| .9 | 7840 | 10940 | 10560 | 9260 | 8580 | 7260 | 3680 | 2100 | 1360 | 920 | 500 |
| 1.0 | 7320 | 9980 | 9640 | 8440 | 7820 | 6600 | 3340 | 1900 | 1220 | 820 | 440 |
| 1.1 | 6860 | 9160 | 8860 | 7760 | 7200 | 6100 | 3060 | 1720 | 1100 | 720 | 380 |
| 1.2 | 6440 | 8480 | 8180 | 7180 | 6640 | 5600 | 2820 | 1580 | 1000 | 650 | 320 |
| 1.3 | 6080 | 7880 | 7600 | 6660 | 6180 | 5200 | 2600 | 1440 | 900 | 580 | 280 |
| 1.4 | 5740 | 7360 | 7100 | 6220 | 5760 | 4840 | 2420 | 1320 | 820 | 520 | 240 |
| 1.5 | 5460 | 6880 | 6660 | 5820 | 5380 | 4520 | 2240 | 1220 | 740 | 460 | 200 |
| 1.6 | 5180 | 6480 | 6260 | 5480 | 5060 | 4240 | 2100 | 1140 | 680 | 420 | ... |
| 1.7 | 4940 | 6120 | 5900 | 5200 | 4780 | 4000 | 1960 | 1060 | 620 | 380 | ... |
| 1.8 | 4700 | 5780 | 5560 | 4880 | 4500 | 3780 | 1840 | 980 | 580 | 340 | ... |
| 1.9 | 4500 | 5480 | 5280 | 4620 | 4260 | 3580 | 1740 | 920 | 520 | 300 | ... |
| 2.0 | 4300 | 5200 | 5020 | 4380 | 4060 | 3380 | 1640 | 840 | 480 | 260 | ... |
| 2.1 | 4120 | 4960 | 4780 | 4180 | 3860 | 3220 | 1540 | 800 | 440 | 240 | ... |
| 2.2 | 3960 | 4740 | 4640 | 3980 | 3680 | 3060 | 1460 | 740 | 400 | 220 | ... |
| 2.3 | 3800 | 4520 | 4360 | 3800 | 3500 | 2920 | 1380 | 700 | 380 | ... | ... |
| 2.4 | 3660 | 4320 | 4180 | 3640 | 3360 | 2800 | 1300 | 660 | 340 | ... | ... |
| 2.5 | 3540 | 4140 | 4000 | 3480 | 3220 | 2680 | 1240 | 600 | 300 | ... | ... |
| 2.6 | 3400 | 3980 | 3840 | 3340 | 3080 | 2560 | 1180 | 560 | 280 | ... | ... |
| 2.7 | 3280 | 3820 | 3680 | 3200 | 2960 | 2460 | 1120 | 540 | 260 | ... | ... |
| 2.8 | 3180 | 3680 | 3540 | 3120 | 2840 | 2360 | 1080 | 500 | 220 | ... | ... |
| 2.9 | 3080 | 3540 | 3420 | 2960 | 2740 | 2260 | 1020 | 460 | 200 | ... | ... |
| 3.0 | 2980 | 3420 | 3300 | 2860 | 2640 | 2180 | 980 | 440 | 180 | ... | ... |

DIESEL ENGINE

TYPE — Baldwin, vertical, 4 cycle, $12\frac{3}{4}$ " bore x $15\frac{1}{2}$ " stroke, developing rated power at 625 R.P.M. (at sea level).

DIRECTION OF ROTATION — The engine rotation is counter-clockwise when viewed from the generator end.

ARRANGEMENT — The governor, fuel transfer pump, fuel oil filter, and fuel injection pumps are on the camshaft side of the engine, with the generator at the left. The air intake header and exhaust manifold, are on the opposite side.

BEDPLATE — The bedplate is of welded steel construction, arranged with an extension to support the generator.

CRANKSHAFT — The crankshaft consists of a heat treated solid steel forging which is drilled for pressure lubrication. The crankshaft journals are $8\frac{3}{4}$ " diameter and crankpins are $8\frac{3}{8}$ " diameter.

MAIN BEARINGS — The crankshaft is supported in precision type bearing shells which are fitted to the bedplate. The bearings are removable through the inspection ports without disturbing the crankshaft.

FRAME AND CYLINDER HOUSING — The engine frame is a welded steel structure which forms the cylinder housing and upper part of the crankcase.

CYLINDER LINERS — The cylinder liners are made of high grade cast iron and are fitted into the upper section of the frame. Each liner is provided with rubber rings at the lower end to seal the joint between liner and frame. This arrangement permits free expansion and contraction of the liner due to temperature changes.

PISTONS — The pistons are made of heat treated aluminum alloy and are oil cooled by means of a constant flow of oil passing through a "cast in" steel coil, supplied from wrist pin bearings, returning to crankcase by gravity. Each piston is arranged with four compression rings and three lubricating oil control rings,

one of the latter being located above the wrist pin and two below.

CONNECTING RODS — Connecting rods are drop forged, heat treated alloy steel, with interchangeable bearing shells. Connecting rod bolts are made of heat treated alloy steel. The wrist pin bearing consists of a bronze bushing pressed into the eye of the connecting rod. The connecting rods are drilled for lubrication of wrist pin bearings.

CYLINDER HEADS — Cylinder heads are individual castings of annealed high grade iron, and are attached to the frame by heat treated alloy steel studs. Each head is provided with two exhaust valves and two air intake valves. The fuel injector is located in the center of head. The valves and actuating mechanism are enclosed by removable aluminum covers.

VALVES — The exhaust and inlet valves are made of heat treated alloy steel and each valve is provided with two alloy steel springs concentrically arranged. The valves are actuated by rocker arms mounted on brackets attached to the cylinder heads. The rocker arms are actuated by hollow push rods, socket mounted in cam followers of the roller type. Valves, rocker arms, and push rods are lubricated from the engine pressure system.

CAMSHAFT — Camshaft is driven by means of a roller type chain located at the generator end of the engine, and is mounted in split type removable bearing shells. The camshaft is made up in two sections bolted together, each section being separately removable.

FUEL INJECTION SYSTEM — Fuel injection system is of the solid injection type with spring loaded, multi-hole spray nozzles. An individual fuel pump is provided for each cylinder. A motor driven pump transfers fuel oil from the storage tank through a suction strainer and cartridge type filter and charges a fuel line from which the fuel injection pumps take their supply. Relief valves and fuel cut-off valves are in the supply line. The pressure in the fuel oil line is indicated by a gauge mounted on the engine control panel.

OVERSPEED STOP — The overspeed stop is of the centrifugal trip type and is driven from the camshaft by gears. This device shuts the engine down if the engine speed exceeds the predetermined maximum speed setting.

GOVERNOR — The governor is of the hydraulic relay type, gear driven from the camshaft, and is controlled pneumatically from the cab. The governor maintains the proper engine speed by controlling the quantity of fuel delivered by the injection pumps. The governor oil pressure actuates the load control valve which in turn controls the exciter field of the electric transmission system.

LUBRICATION — The lubricating oil system is a pressure system with oil circulated by a positive displacement gear pump chain driven from the crankshaft. The lubricating oil is contained in the engine bedplate; from where it is drawn, through a suction strainer, by the pump and circulated through the external lubricating oil system, consisting of a cartridge type filter, heat exchanger and metal edge strainer. The oil is then delivered to the inlet header of the engine where the oil passes under pressure to the main bearings. From the main bearings the oil is conveyed through passages in the crankshaft to the crankpin bearings and to the wrist pin bearings through the center holes of the connecting rods. The oil circulates from the wrist pin through the piston cooling coil and is returned to the bedplate.

STARTING — The engine is started by the generator operating as a motor, receiving its power from the storage battery.

ELECTRICAL EQUIPMENT

MAIN GENERATOR — Main generator is a direct current, interpole, self-ventilating, separately excited type, having a single self-aligning roller bearing. It is supported from the Diesel engine bedplate with the armature solidly connected to the Diesel engine crankshaft. It furnishes power to the traction motors.

AUXILIARY GENERATOR-EXCITER UNIT — The auxiliary generator-exciter unit is mounted on the main generator, being driven by V-belts from the main generator shaft extension.

The auxiliary generator part of the unit provides power for charging the storage battery, control circuits, lighting circuits and fuel pump motor. A voltage regu-

lator is provided to maintain suitable voltage at all engine speeds.

The exciter part of the unit is of the differential type providing power for exciting the fields of the main generator, and in conjunction with an engine control load regulator, maintains full engine output over the entire operating range.

TRACTION MOTORS — Traction motors are series wound, force ventilated, axle hung, with single reduction gearing to axles.

INSULATION — Class "B" insulation is used on rotating equipment.

TRACTION MOTOR BLOWERS — Blowers provide forced ventilation to the traction motors. A flexible air duct is applied between the traction motors and the air conduit.

CONTROL EQUIPMENT — One set of electro-pneumatic control equipment is provided to operate the traction motors from the generator. The traction motors are permanently connected in series-parallel with no transition and are provided with two steps of field shunting automatically and electrically actuated at the proper locomotive speed.

The unit switches and reverser in main circuits are electro-pneumatically operated. Wheel slip relay operates a buzzer, warning the engineer when slipping of a pair of wheels occurs, and at the same time automatically reduces power until wheels stop slipping, after which power is automatically reapplied to coincide with position of throttle.

ELECTRICAL EQUIPMENT CABINET — Electrical equipment cabinets are mounted behind operator's cab and contain the electrical switches, reverser and power contactors for main and auxiliary circuits.

STORAGE BATTERY — Storage battery is provided for engine starting, control and lighting circuits. It is charged from the auxiliary generator under control of a voltage regulator and is protected by a reverse current relay and charging resistor.

RUNNING LIGHTS — Suitable headlights are provided for the locomotive with dimming control. Number and classification lights are applied on each side of locomotive.

MECHANICAL EQUIPMENT

ENGINE COOLING — A chain driven centrifugal water-pump, mounted on the engine, circulates water through the engine and radiator. The radiator assembly consists of radiators, cooling fans, air duct, shutters, and piping. Cooling air is drawn through grilles alongside of locomotive and passes unfiltered through the water radiators, and the axial flow electric motor driven thermostatically controlled fans on top of the locomotive.

AIR BRAKES — Independent locomotive brakes and automatic train brakes are provided with train line connections at each end of the locomotive. Brake schedule is 24 RL with DS 24 pedestal brake valve.

AIR RESERVOIRS — Air reservoirs are provided having 34,800 cubic inch capacity per unit, and fitted with safety valves. Reservoirs are conveniently located so that they may be easily inspected and tested.

AIR COMPRESSOR — Compound 3-cylinder air compressor is furnished equipped with unloading control, set to unload the compressor at 140 p.s.i.

FOUNDATION BRAKES — Foundation brakes are designed for maximum accessibility and efficiency.

BRAKE SHOES — Brake shoes are made of cast iron with steel backing.

HAND BRAKE — The hand brake is suitably connected and is operated from inside of locomotive.

CAB — The cab is constructed of metal plates and shapes, thoroughly braced, electrically welded. The entire unit is rigidly secured to the underframe. Stationary and operable metal cab window frames are provided wherever required. Cab doors are of metal, and both cab window frames and doors are glazed with shatter-proof glass. Walls and ceiling of control cab are lined with insulating material. Rain gutters are applied over all outside doors and movable windows.

LOCOMOTIVE EQUIPMENT — Suitable cushioned seats and upholstered arm rests, are provided for operator and helper at their respective windows. Locomotive

fixtures include pneumatic window wipers, fire extinguishers, cab lights, heater, brake gauges, wheel slip buzzer, inspection card holder, headlight, engine compartment lights, bell, horns, sander, sunvisors, toilet.

ENGINE COMPARTMENT — The engine compartment is constructed of sheet metal, substantially braced with carlines. It is designed for ready access to and for removal of equipment. Roof hatches give ready access to engine heads, valve actuating mechanism and other equipment. Ventilation is accomplished through side filters. Permanent light fixtures for inspection lamps are provided. Passageway flooring is of non-skid design. Rain gutters are applied over all outside doors.

SANDING — Four sand boxes are provided with a capacity of 20 cubic feet per unit. Provision is made for sanding leading wheels on each truck of leading "A" unit and the leading wheels on the front truck only of the "B" units.

COUPLERS — A.A.R. standard E.

SWIVEL TRUCKS — Trucks are of one piece cast steel frame construction, with equalizer, swing bolster and suitable springs. Center pin bearings are fitted with high carbon steel side and bottom liners, lubricated and protected by dust guards. Truck pedestal jaws are fitted with high carbon steel liners. Axles are of forged steel with journals as specified. Wheels are heat treated having rims 5½" wide with A.A.R. standard flange gauge.

FUEL OIL TANK — The fuel oil tank is of welded steel construction substantially braced, having baffle plates located to prevent surging. Tank is equipped with Protecto-Seal vents and filler caps and liquid level indicators.

VESTIBULE — Combination vestibule diaphragm and spring buffer is provided between units.

GENERAL

MODIFICATIONS — Dynamic braking with titelock couplers between units, drop coupler and coupler covers, hostler control, M385 draft gear, third seat in cab, speed recorder and overspeed control, drinking water cooler, and standby heater.