The works are equipped throughout with the highest class machinery and plant, all parts are made accurately to gauge and template, and large stocks are carried so that duplicate parts can generally be delivered from stock. Standard locomotives, internal combustion and steam, are generally under construction and early deliveries can be given.

The Companies associated were the pioneers of the Internal Combustion Rail Car and Internal Combustion Locomotives, and the principal members of the staff have been engaged in the construction of steam locomotives for the last 30 years.

The Company are prepared to design and manufacture locomotives for any condition of service, and can quote prices packed and delivered at Works or F.O.B.

Particulars are given of the various types of locomotives built by the Company and general data as to loads hauled, minimum weight of rail, and curves for both internal combustion and steam. All enquiries and orders to state the gauge of the railway (between the heads of the rails), weight of rail, distance apart of sleepers, maximum load to be hauled on the level, radius of sharpest curve, length and gradient of steepest incline, sketch of the wagon or rolling stock to be used and maximum loading gauge.

GENERAL SPECIFICATION OF STEAM LOCOMOTIVE

BOILER.—The boilers are of best boiler steel, and constructed for an ordinary working pressure of 150 lbs. per square inch and tested by hydraulic pressure of 250 lbs. per square inch. The longitudinal seams of the barrel are all double riveted lap joints, and the circular stems single riveted lap joints.

The fire box shell is constructed of special flanging steel, and flanged to receive the barrel and wrapper plate which is in one piece.

The fire box is of best copper, the tube plate being thickened to take the tubes.

The crown of the fire box is supported by direct stays and the flat surface of the fire box by screwed copper stays $\frac{7}{8}$ in. diameter and riveted over.

The flat surface of the fire box shell and tube plate are supported by longitudinal or angle stays.

TUBES.—The boilers are fitted with solid drawn brass tubes 12 to 14 wire gauge, expanded at the smoke box end and ferruled at the fire box end.

MOUNTINGS.—The boilers are mounted with :—

A complete set of boiler mountings.
Water gauge.
Steam blower.
Two injectors.
Steam pressure gauge.
Blow off cock.
Steam whistle.
Two clack boxes.
Fusible plug.
Necessary wash out plugs and mud doors.

SAFETY VALVE.—The safety valve is of the Ramsbottom type fitted on the fire box shell or dome top.

LAGGING.—The boilers are clothed with well seasoned pine battens and covered with steel planished sheets.

BOILER FEED.—The boilers are fed by two Gresham and Craven Self Acting Restarting Injectors fitted with the necessary feed pipes and connections. The pipes to be of copper and the flanges gunmetal.

CYLINDERS.—The cylinders are of best close grained cylinder metal secured to the main frame by turned bolts.

PISTONS.—Pistons are of cast iron fitted with cast iron spring rings, cross heads are of cast steel lined with white metal of the single slide bar type, slide doors of Bessemer steel fitted with adjustable liners. The piston rods are of crucible cast steel tapered at each end and secured to the cross head by cotter and the piston by phosphor bronze nut.

FRAMES.—The frames are of mild steel rolled in one piece, stayed by transverse stays and angles.

GENERAL SPECIFICATION OF STEAM LOCOMOTIVE—*continued*

BUFFER BEAMS.—Buffer beams are of mild steel secured to frames by angles, the buffer and draw gear to be arranged to suit rolling stock.

CONNECTING AND COUPLING RODS.—Connecting and coupling rods are of solid forged mild steel, the connecting rods being fitted with adjustable brasses and cotters at the big end, and phosphor bronze bushes at the small end. Coupling rods are fitted with phosphor bushes and are arranged with solid forged syphon lubricators.

AXLE BOXES AND GUIDES.—The axle boxes and guides are of cast iron fitted with heavy phosphor bronze bearings lined with white metal and arranged for syphon lubrication, and spring oil pads in the keep. The axle box guides are machined and secured to the frame by turned bolts.

AXLES.—The axles are of best axle steel, British standard main line specification for straight axles.

WHEELS.—The wheels are of cast steel or cast iron, when fitted with rolled steel tyres the wheels are forced on to the axles by hydraulic pressure at not less than 8 tons per inch diameter of axle.

SPRINGS.—Springs to be of best Sheffield make of laminated form tested for the weights they have to carry.

VALVE MOTION.—The valve motion to be forged steel throughout and case hardened on all wearing parts. All standard narrow gauge locomotives to be fitted with " Baguley " outside radial gear and standard shunting engines of the Stephenson Link Motion.

BRAKES.—Hand screw brake to be fitted to all four wheels, the brake blocks being of cast iron.

TANKS.—Tanks to be of best steel plate with riveted or welded ends.

COAL BUNKER.—Coal bunker to be of steel plate.

CAB.—To suit requirements.

LUBRICATOR.—A displacement lubricator to be fitted to cylinders.

TOOLS.—The following tools supplied with each locomotive :—

1 set of spanners.
1 movable hand spanner.
1 each right hand hammer.
3 files.
3 chisels.
3 spare gauge glasses.
1 oil can.
1 oil feeder.
1 coal scuttle.
1 small crow bar.
1 gauge glass lamp.
1 complete set of fire irons and shovels.

PAINTING.—The engine to be painted three coats of lead, three coats of approved colour and finally lined and varnished.

WORKMANSHIP AND MATERIAL.—The workmanship and material throughout is of the best description equal to main line.

APPROXIMATE WEIGHT AND DUTIES OF STANDARD FOUR COUPLED LOCOMOTIVES WITH A WORKING STEAM PRESSURE OF 150 lbs. PER SQ. INCH

Cylinder	4″×8″	5″×8″	6″×9″	7″×12″	8″×12″	9″×14″	10″×15″	12″×18″	13″×18″	14″×20″	15″×22″
H.P.	10	15	25	45	60	85	100	150	180	200	250
Gauge	1′ 6″ to 2′ 6″	1′ 6″ to 2′ 6″	1′ 6″ to 3′ 0″	2′ 0″ to 3′ 3⅜″	2′ 0″ to 4′ 8½″	2′ 0″ to 4′ 8½″	2′ 0″ to 4′ 8½″	2′ 0″ to 4′ 8½″	2′ 0″ to 4′ 8½″	2′ 0″ to 4′ 8½″	2′ 0″ to 4′ 8½″
Heating Surface Sq. Ft.	70	78	94	143	177	225	300	425	450	550	700
Grate Area Sq. Ft.	2.25	2.5	3	4	4.75	4.75	5.25	6.5	7.5	9	11
Steam Pressure	150	150	150	150	150	150	150	150	150	150	150
Tubes	Brass	Brass	Brass	Brass	Brass	Brass	Brass	Brass	Brass	Brass	Brass
Fire Box	Copper	Copper	Copper	Copper	Copper	Copper	Copper	Copper	Copper	Copper	Copper
Dia. Wheels in Ft.	1′ 3½″	1′ 4½″	1′ 6½″	1′ 9½″	2′ 0″	2′ 3″	2′ 6″	3′ 0″	3′ 3″	3′ 6″	3′ 9″
Wheelbase	2′ 6″	2′ 9″	3′ 0″	3′ 6″	4′ 6″	5′ 0″	5′ 3″	5′ 3″	5′ 6″	6′ 0″	6′ 0″
Tank Capacity Gallons	60	70	80	180	225	250	300	400	450	500	700
Coal Bunker Cubic Ft.	4	4½	5	7	8	12	15	20	22	25	35
Weight Working Order Tons	3½	4	5½	7½	9¼	12	14.5	18	21	24	27
Tractive Power in lbs. at 75% Boiler Pressure	962	1,400	2,018	3,137	3,584	4,704	5,600	8,060	8,736	10,400	11,200
Load will haul on level in tons at 15–25 lbs. per ton rolling resistance	58 31	86 52	125 71	187 118	223 133	293 176	348 269	506 304	547 328	653 392	701 421
Incline of 1 in 75	17	26	39	62	70	90	106	157	167	201	211
	14	21	31	51	57	73	87	128	137	165	176
,, 1 in 50	12	19	28	45	50	64	76	113	121	145	155
	10	16	23	38	43	55	65	97	103	124	133
,, 1 in 25	4.6	6.5	13	22	24	31	37	57	60	72	76
	4.2	5.9	12	20	22	28	34	52	55	66	70
,, 1 in 15	1.6	2.6	6.4	11	12	15	18	30	30	37	39
	1.5	2.4	6	10	11	14	17	28	28	35	37
Minimum Curve recommended in Ft.	24	28	36	48	80	100	110	110	120	140	140
Minimum Curve Engine will pass over, in Ft.	18	21	27	36	60	75	80	80	90	100	100
Minimum Weight of Rail per yard lbs.	14	16	20	30	36	40	50	60	65	70	80

All the above Locomotives can be built for any gauge up to 4′ 8½″, the wheelbase being increased, and can be constructed to burn oil fuel.

NARROW GAUGE PASSENGER ENGINE 4-4-0

Cylinder	8″×12″	9″×14″	10″×15″	12″×18″	13″×18″
H.P.	60	90	115	200	230
Gauge	2′ 0″ to 4′ 8½″	2′ 0″ to 4′ 8½″	2′ 0″ to 4′ 8½″	2′ 0″ to 4′ 8½″	2′ 0″ to 4′ 8½″
Heating Surface in Sq. Ft.	225	262	350	425	500
Grate Area Sq. Ft.	4.5	5.25	6.5	8	9
Steam Pressure	150	150	150	150	150
Tubes	Brass	Brass	Brass	Brass	Brass
Fire Box	Copper	Copper	Copper	Copper	Copper
Wheels dia. in Ft.	2′ 3″	2′ 6″	2′ 9″	3′ 0″	3′ 0″
Wheelbase	13′ 0″—5′ 0″	13′ 6″—5′ 3″	15′ 0″—6′ 0″	16′ 6″—6′ 6″	18′ 6″—7′ 6″
Tank Capacity Gallons	200	250	350	450	550
Coal Bunker Cubic Ft.	20	25	30	40	50
Weight in working order Tons	11½	13½	17	24½	28
Tractive Power in lbs. at 75% Boiler Pressure	3,410	4,033	5,090	8,064	9,464
Load will haul on level in tons at 15–25 lbs. per ton rolling resistance	208 120	246 147	311 186	493 298	584 350
On incline of 1 in 25	65	75	94	153	180
	53	61	77	124	147
,, 1 in 50	44	52	64	108	127
	38	45	55	92	109
,, 1 in 25	20	24	30	51	61
	18	22	28	46	55
,, 1 in 15	8.5	10	13	23	28
	8	9	12	21	26

All above Locomotives can be constructed to burn Wood Fuel.

GENERAL DESCRIPTION OF INTERNAL COMBUSTION ENGINE

THE Internal Combustion Locomotive's principal advantage lies in the fact that it can be used under special conditions, where it would be impossible to use a steam, owing to the fire and smoke. It also has the great advantage that, when the work is not regular, it can be left standing until it is required for use, and started at a moment's notice. It can be run into shops and works without danger of fire or fouling the atmosphere by smoke and steam, and for shunting work where loads are not being dealt with all day it possesses very great advantages as it can be started up at once, deal with the loads, and the whole cost can be stopped on completing its work.

It also can be worked entirely by one man.

They can use as fuel either petrol, benzol, or can be arranged for paraffin.

They will not of course compare with steam locomotives for continuous heavy running, as the engine develops its full h.p. when running at the specified speeds. It has one defect that it can only start a comparatively small load compared with the steam, which can exert its maximum tractive effort at starting.

A very large number of Internal Combustion Locomotives from 10 to 150 h.p. have been constructed at these works, and the present locomotives are the result of the running.

We have no hesitation in stating at the present time our Internal Combustion Locomotive is far ahead of any on the market. The new patent drive, which eliminates changing gears, makes it as easy to work as a steam locomotive, and has the same levers, a throttle which takes the place of the regulator, a change speed lever which takes the place of a reverse on a steam locomotive. The principal drive is extremely simple; when the engine is running the reverse lever is put in the required direction and all that is necessary is to slightly accelerate the engine by a regulator lever, and push the change speed lever into the bottom gear. As soon as the engine has obtained sufficient momentum, by merely pulling the lever over to the opposite direction it is in the first speed.

The lubrication is entirely automatic.

The engines are all constructed at these works, of special heavy design, and are constructed throughout of the very best material, and are thoroughly tested before leaving the works, both in the test shop and on a railway.

STANDARD INTERNAL COMBUSTION ENGINES

B.H.P.	Size of Engine.	Speed in miles per hour.	Weight in running order. Tons.	Type.	Adhesion in lbs.	Tractive Effort 65% efficiency in lbs.
12/15	2 cyl. 4″×5″	3 6	2	4-coupled	950	1,500 500
25/30	4 cyl. 4″×5″	3 6	4	,,	1,800	2,080 1,040
30/35	4 cyl. 4½″×5″	3 6	5	,,	2,250	2,500 1,250
38/40	4 cyl. 6¾″×5½″	3 6	6	,,	2,700	3,166 1,583
45/50	4 cyl. 5″×6″	3 6	7	,,	3,136	3,750 1,875
55/60	4 cyl. 5½″×6″	3 6	8	,,	3,600	4,583 2,291
65/70	6 cyl. 5″×6″	3 6	9	,,	4,050	5,416 2,708
70/75	4 cyl. 5½″×8½″	3 6	10	,,	4,500	5,800 2,900
95/100	4 cyl. 6″×8½″	3½ 7	12	,,	5,400	6,800 3,400
120/135	6 cyl. 6″×8½″	4 8	14	,,	6,300	7,500 3,750
150/160	6 cyl. 6½″×8½″	4 8	17	,,	7,650	9,375 4,687
170/180	8 cyl. 6″×8½″	4 8	20	,,	9,000	11,000 5,500

Load Hauled Exclusive of Locomotive assuming 25 lbs. per ton rolling resistance.							Minimum weight of rail
Level.	1-100	1-75	1-50	1-40	1-30	1-20	
38 19	19 8	16 7	12 5	10 4	8 3	5 2	14
80 40	40 18	33 14	25 10	21 8	16 6	11 4	18
95 47	48 21	40 17	30 12	25 10	20 7	13 4	20
120 60	61 27	51 22	39 16	33 13	25 9	17 5	25
143 76	72 32	61 27	46 19	39 16	30 11	20 6	28
175 87	87 39	75 33	57 24	46 19	37 14	25 8	30
207 103	103 48	89 40	68 29	57 24	45 18	30 10	35
222 111	113 51	96 42	72 31	61 25	48 19	32 11	
200 130	132 60	111 49	85 36	72 30	56 22	38 13	
286 143	145 65	122 54	93 39	78 32	61 23	41 13	
318 159	182 82	153 68	116 49	98 40	76 29	51 17	
420 210	214 107	180 80	136 58	115 47	90 35	60 20	

The Tractive power and loads hauled are all based on the lowest horse-power stated. All the above calculations are based on a rolling resistance of 25 lbs. per ton, and, as the rolling resistance of a main line is 10 lbs. per ton, a heavy margin is allowed, but as Contractor and Railway Sidings are not laid so well and have no real level, it is necessary to make ample allowance. When the Locomotives are actually used on main line or equal much heavier loads can be hauled. Locomotive will start on the incline about 50% of the loads. The speeds shown are our standard Locomotives, but can be built to any speed required, and all Locomotives can be accelerated 25%.

All Locomotives can be built 6 wheels coupled or with Bogies 2 and 4 wheels. Carburettors can be fitted when desired, the horse-power being reduced FUEL.—Petrol and Benzol are standard, but paraffin 10% to 15%.

SPECIFICATION OF INTERNAL COMBUSTION LOCOMOTIVE

DESCRIPTION.—The engine is specially designed for heavy commercial purposes, the cylinders being cast in pairs, complete with water jackets, and in every case develops the H.P. in excess of that specified. The average consumption per B.H.P. is ·75 pints per B.H.P. per hour.

The pistons are of cast iron fitted with toughened cast iron rings finished by grinding and fitted with case hardened steel gudgeon pins accurately ground.

The connecting rods are of high tensile steel fitted with phosphor bronze bush at the small end and adjustable white metal lined brasses at the big end.

The crankshaft is of nickel steel machined all over and ground on journals, supported on gun metal bearings lined with white metal.

The camshaft is of special steel, cams cut from the solid, case hardened and ground.

The valves are of nickel steel turned and ground with adjustable tappets.

The crankcase is of cast iron heavily ribbed and stiffened for locomotive purposes.

The ignition is by high tension magneto.

The lubrication is by mechanical distributor.

The cooling is by rotary pump driven from the engine circulating the water through a large water tank.

TRANSMISSION.—The locomotive has two speeds in each direction, the power being transmitted by bevel reverse spur wheels direct to the driving wheels by coupling rods. The change speed is Baguley's own patent double disc clutch (patents 149450 and 127546).

FRAME.—The frame is of the ordinary locomotive type constructed of mild steel plate securely stayed by cross stays and angles, and the buffer beams are of steel plate, similar quality to the frames and fitted with buffer and draw gear as required.

SPECIFICATION OF INTERNAL COMBUSTION LOCOMOTIVE

—continued

WHEELS.—The wheels are of cast steel up to 18 in. diameter, and cast iron over this size fitted with rolled steel tyres.

AXLES.—The axles are of best axle steel, standard English main line specification for straight axles. The wheels are pressed on the axles by hydraulic pressure not less than 8 tons per inch diameter of axle.

The crank pins of crank pin steel pressed into wheel centres or crank webs and riveted over.

Coupling and connecting rods are solid forged mild steel fitted with phosphor bronze bushes and oil syphons.

AXLE BOXES AND GUIDES.—Axle boxes and guides are of cast iron, boxes are fitted with heavy phosphor bronze bearings and syphon lubrication, also spring pads. The guides are machined and securely bolted to the frame by turned bolts.

SPRINGS.—The springs are of best Sheffield steel tested for the weights they have to carry and fitted with solid forged steel spring hangers.

BRAKES.—Hand screw brakes are fitted acting on all wheels. The blocks are of cast iron.

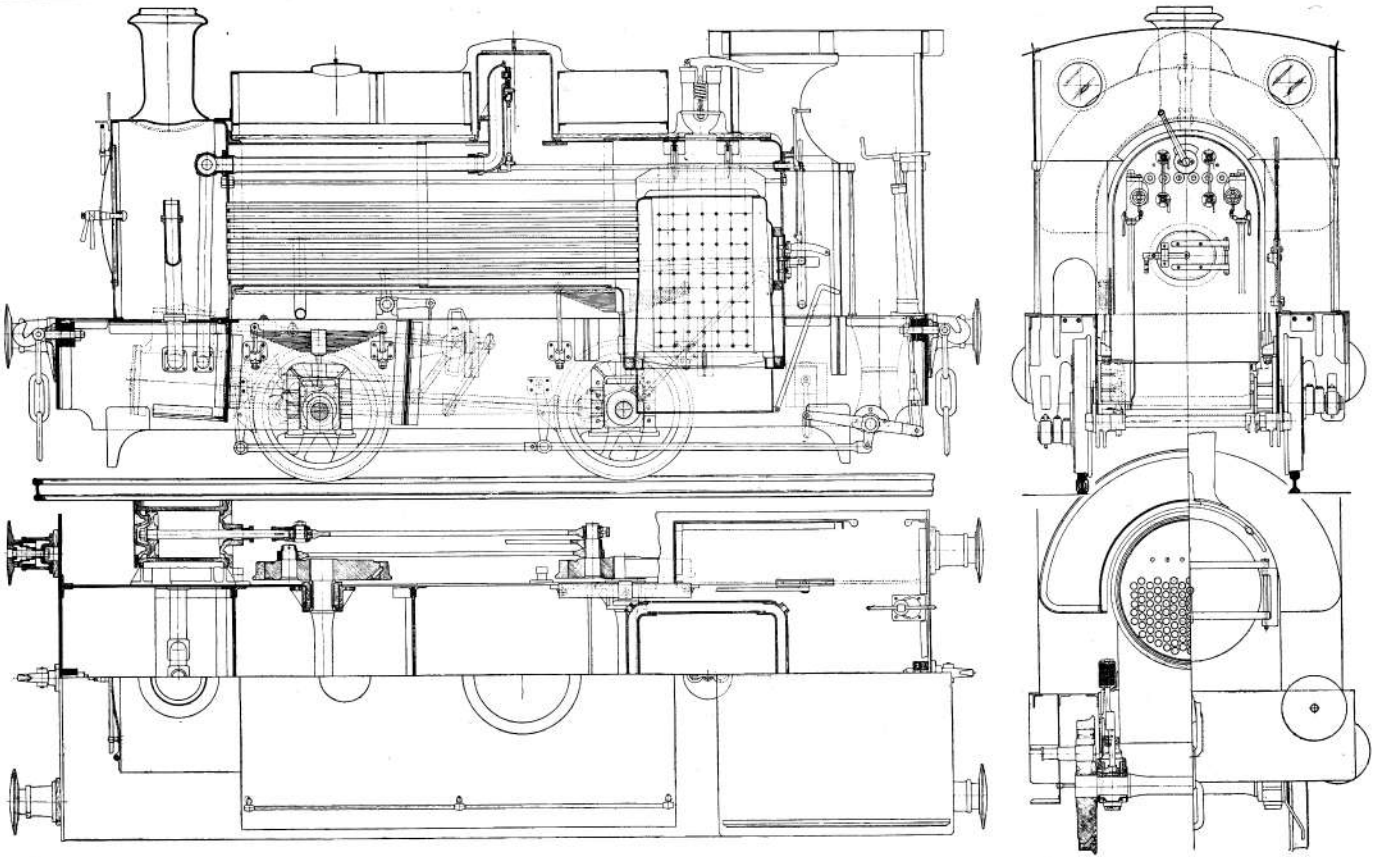
CONTROL.—Controls and brake handle are all mounted inside the driver's cab.

TANKS.—Water and fuel tanks are constructed of steel plates riveted to angles and strapped to bearers on the frame.

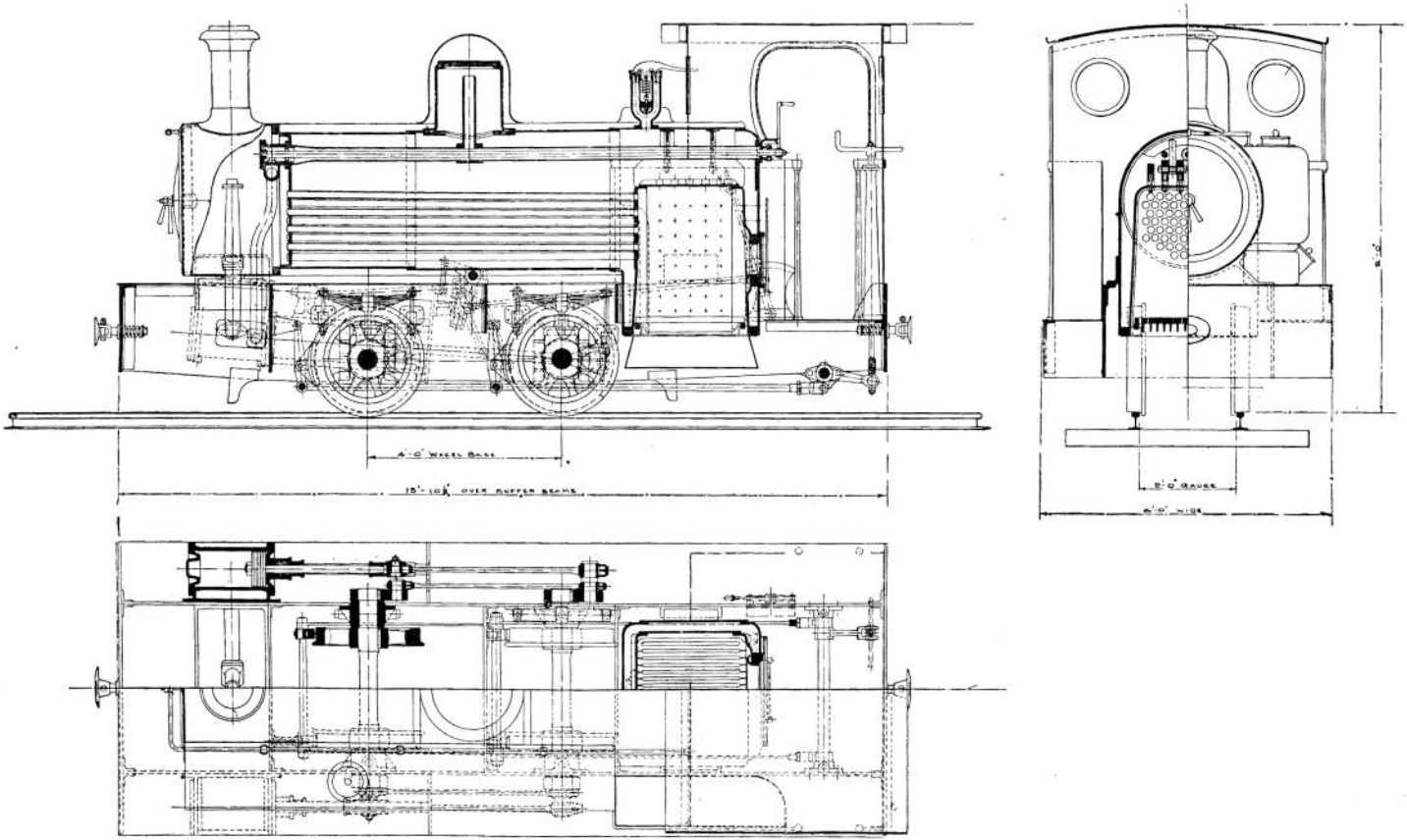
PAINTING.—The locomotive to be painted three coats of lead, three coats of approved colour, and finally lined and varnished.

SPARES.—The following spares are supplied with each locomotive :—

1 set (4) piston rings.
2 valves complete with springs, collar and cotter.
1 set of high tension sparking plugs and washers.
1 set of valve cap washers.
A complete set of tools and spanners and oil feeders.



SECTION OF STANDARD TANK LOCOMOTIVE, Cylinders 10 *to* 14*in. diameter.*

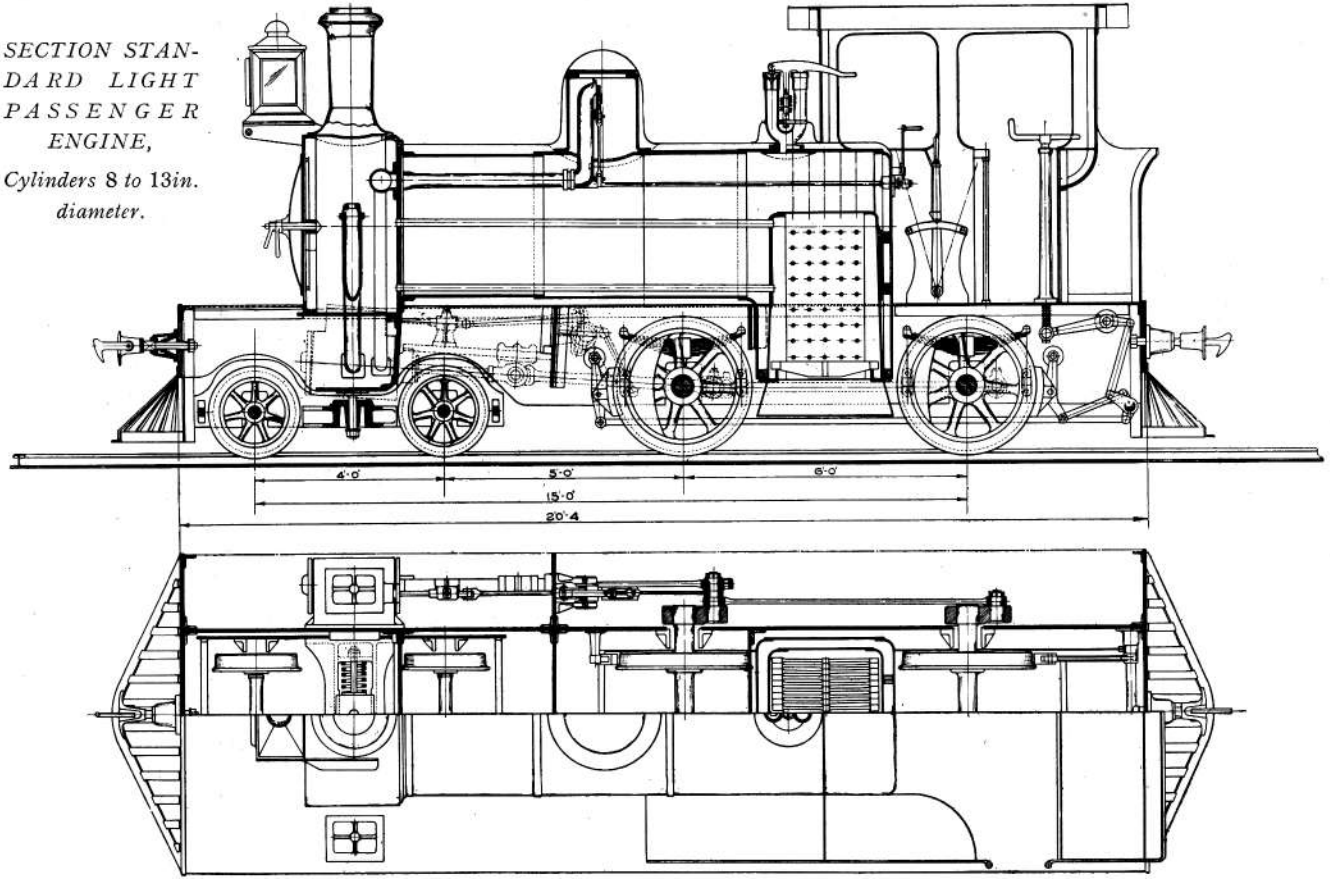


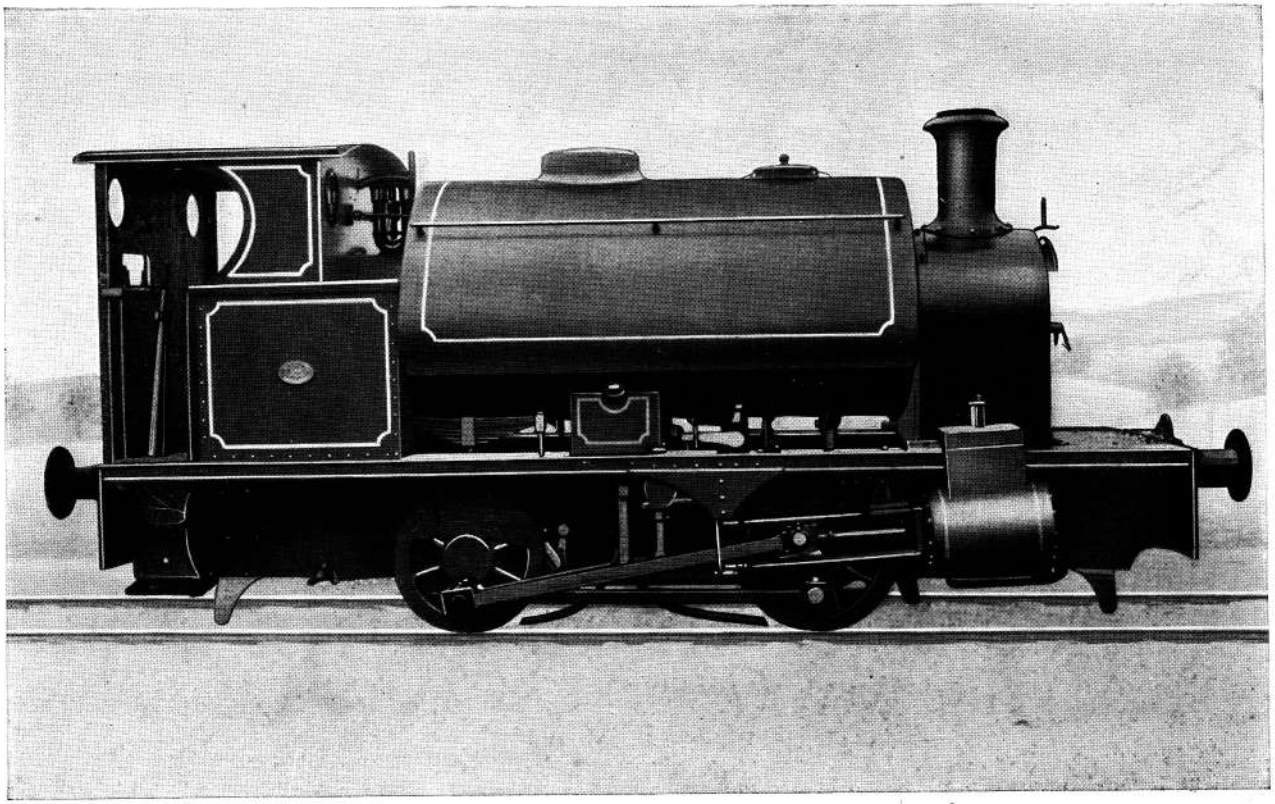
SECTION OF STANDARD NARROW GAUGE LOCOMOTIVE, Cylinders 6 to 12in. diameter.

BAGULEY (ENGINEERS) LIMITED

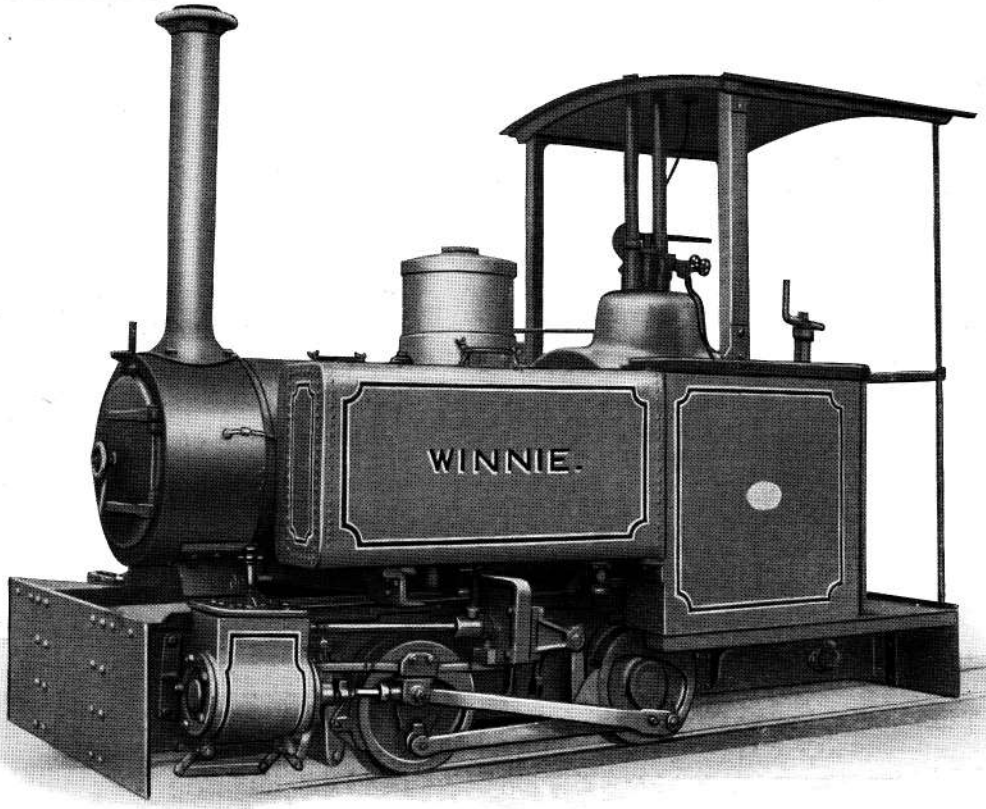
SECTION STANDARD LIGHT PASSENGER ENGINE,

Cylinders 8 to 13in. diameter.

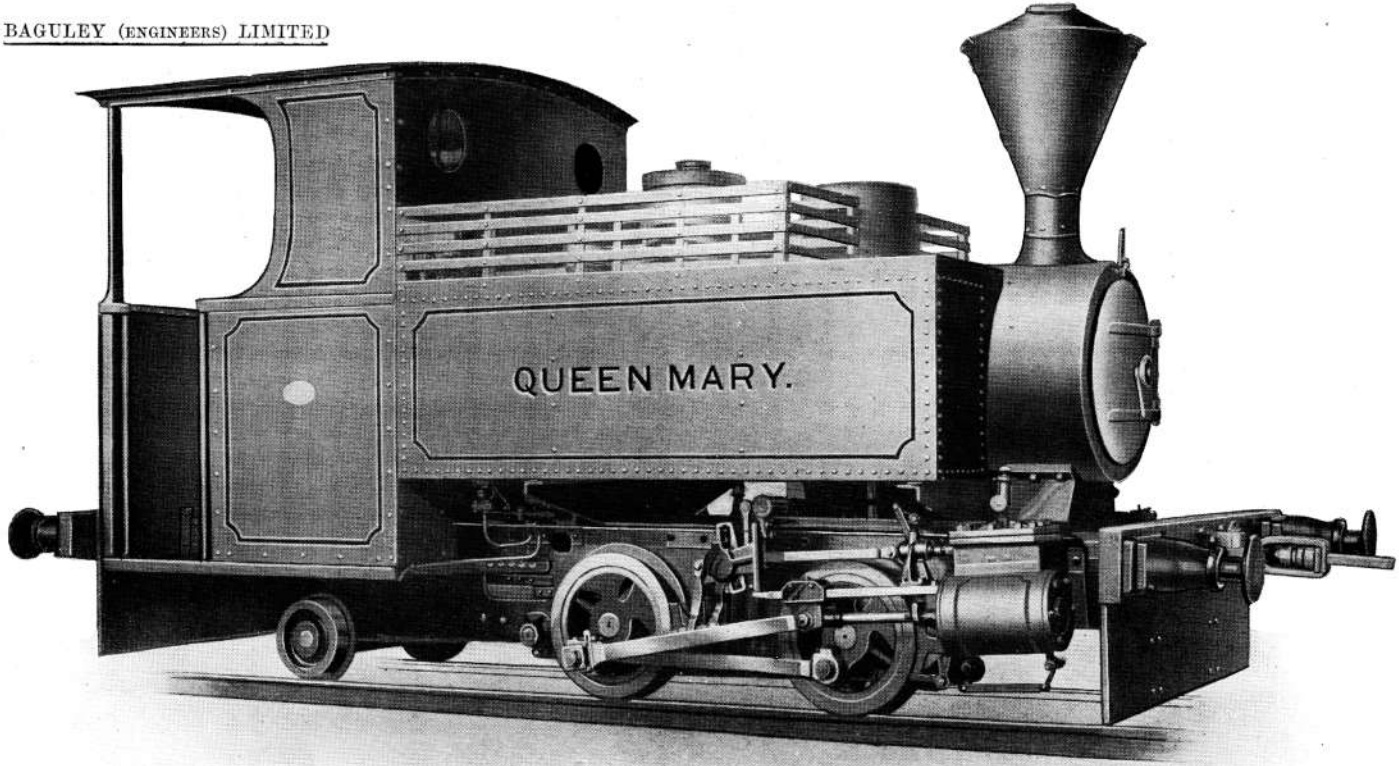




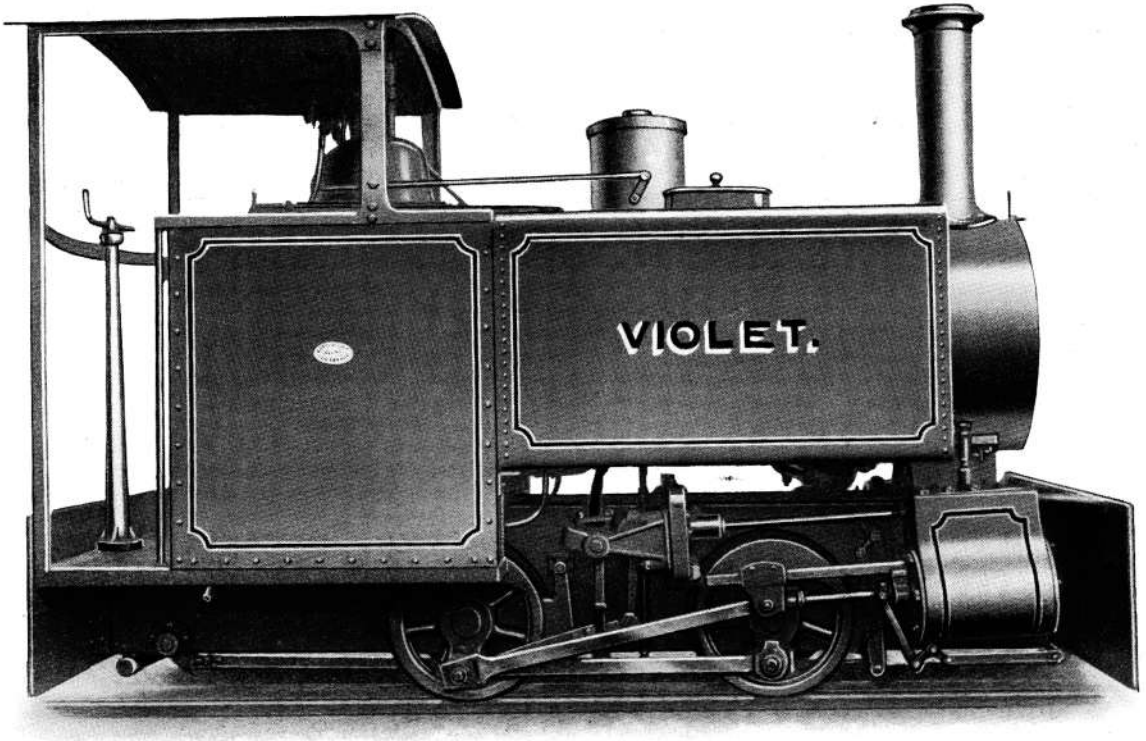
STANDARD SADDLE TANK LOCOMOTIVE, Cylinders 10 *to* 14*in. diameter.*



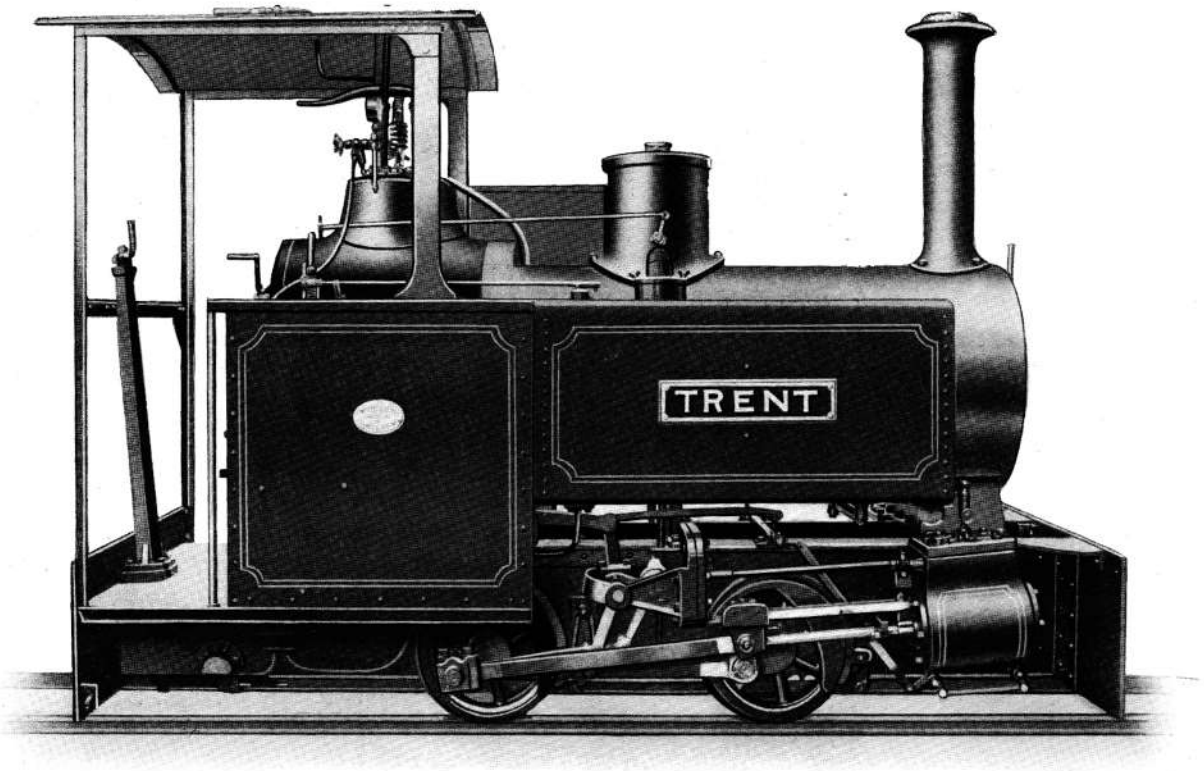
STANDARD 4 and 5in. LOCOMOTIVE.



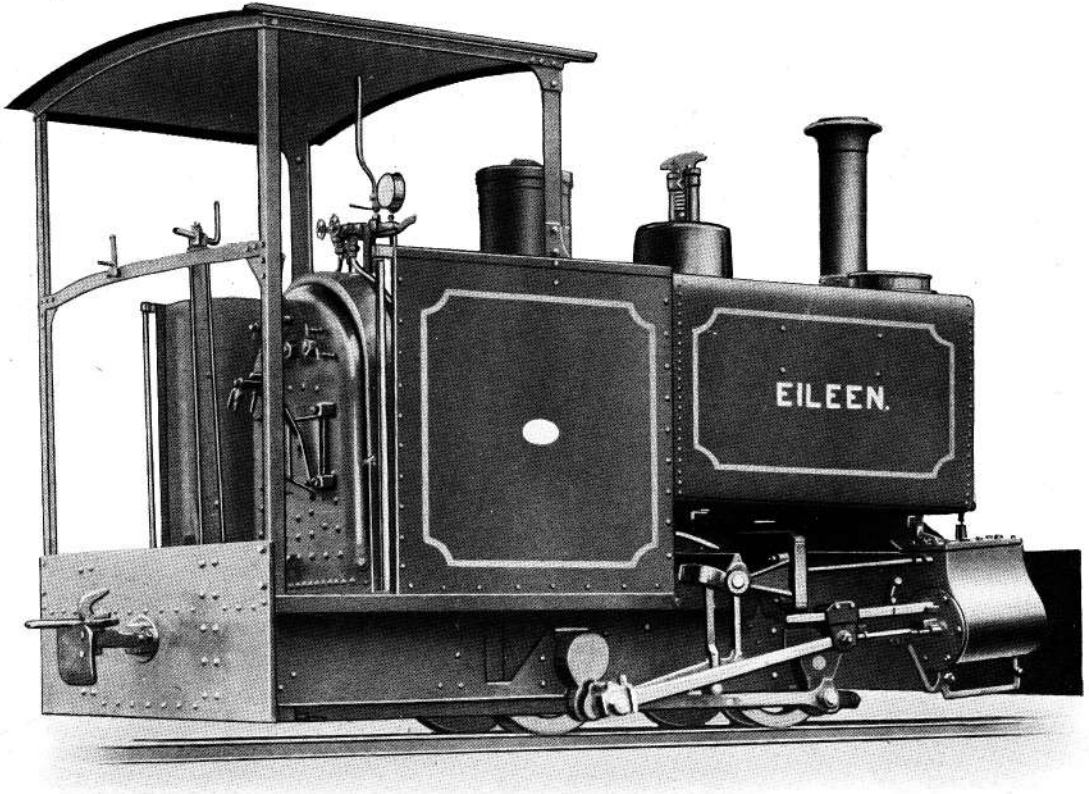
STANDARD NARROW GAUGE LIGHT PASSENGER ENGINE, Cylinders 6 to 12in. diameter.



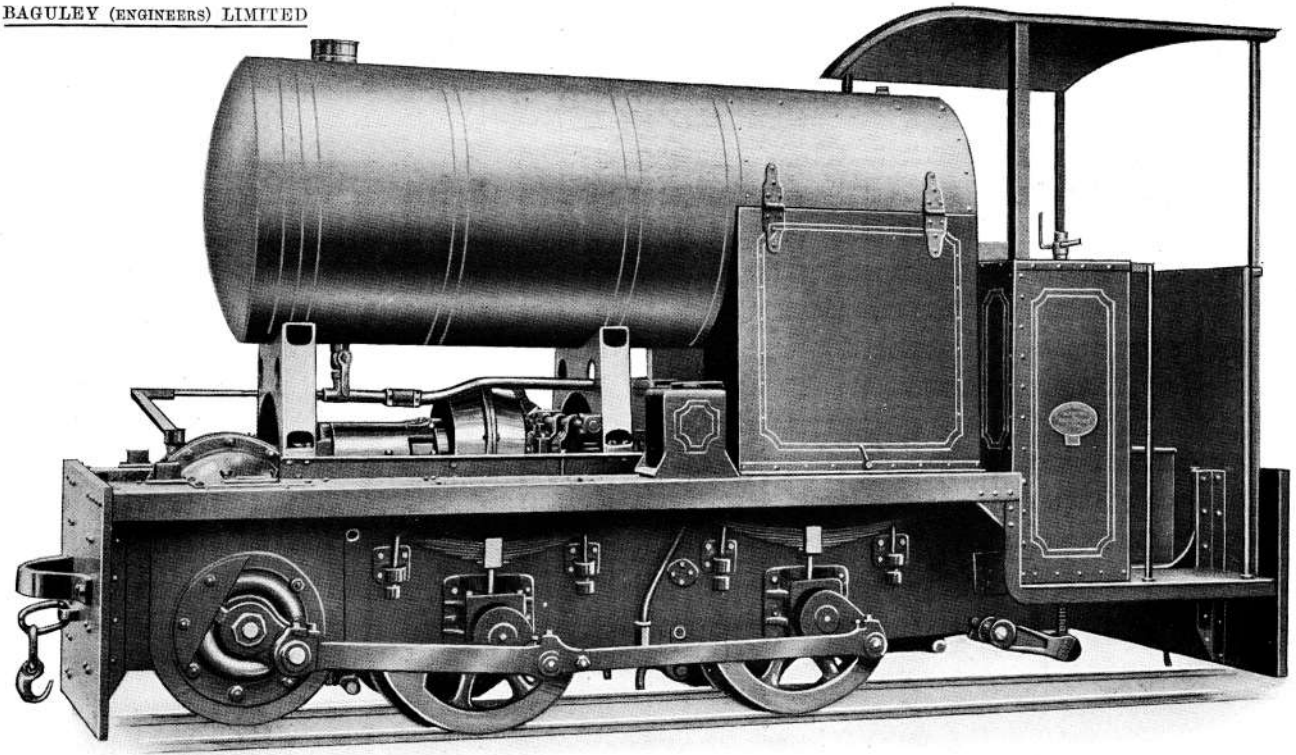
STANDARD NARROW GAUGE TANK ENGINE, Cylinders 6 to 9in. diameter.



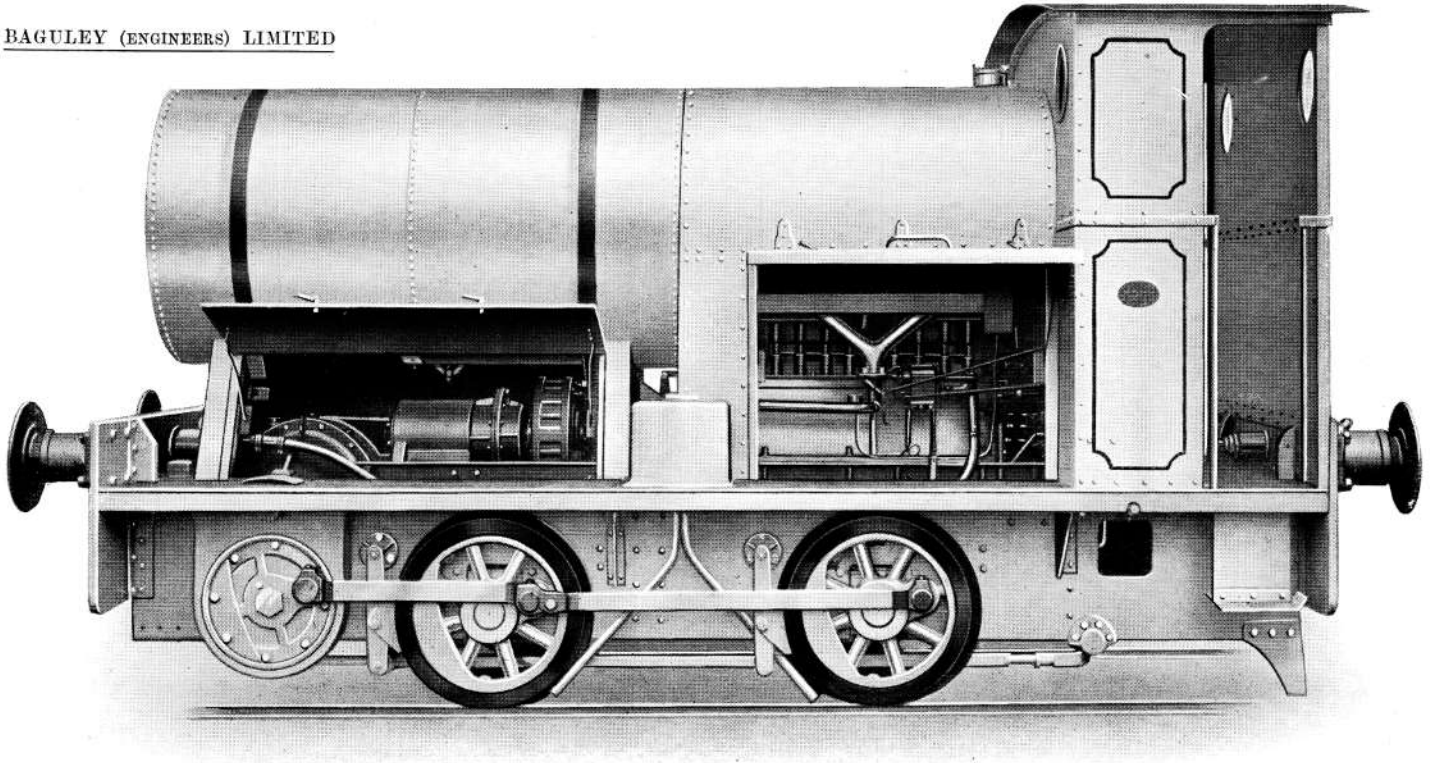
STANDARD NARROW GAUGE TANK ENGINE, Cylinders 6 to 8in. diameter.



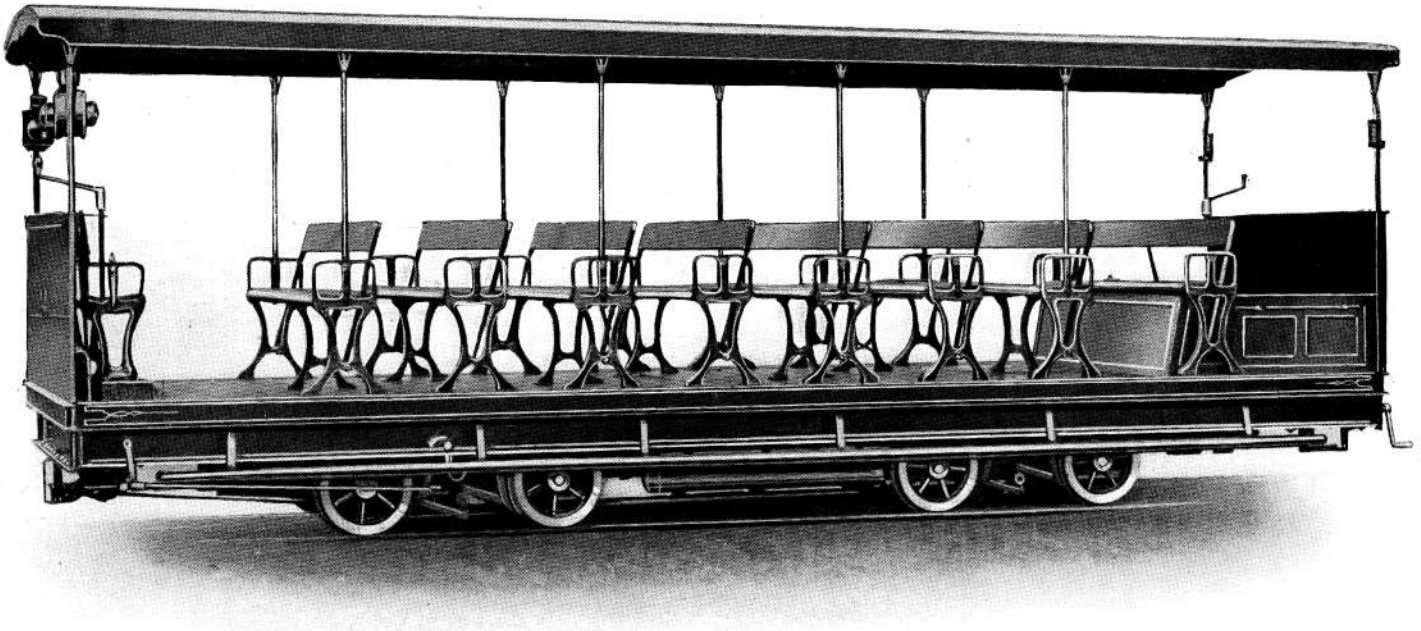
STANDARD NARROW GAUGE TANK ENGINE, Cylinders 6 to 10in. diameter.



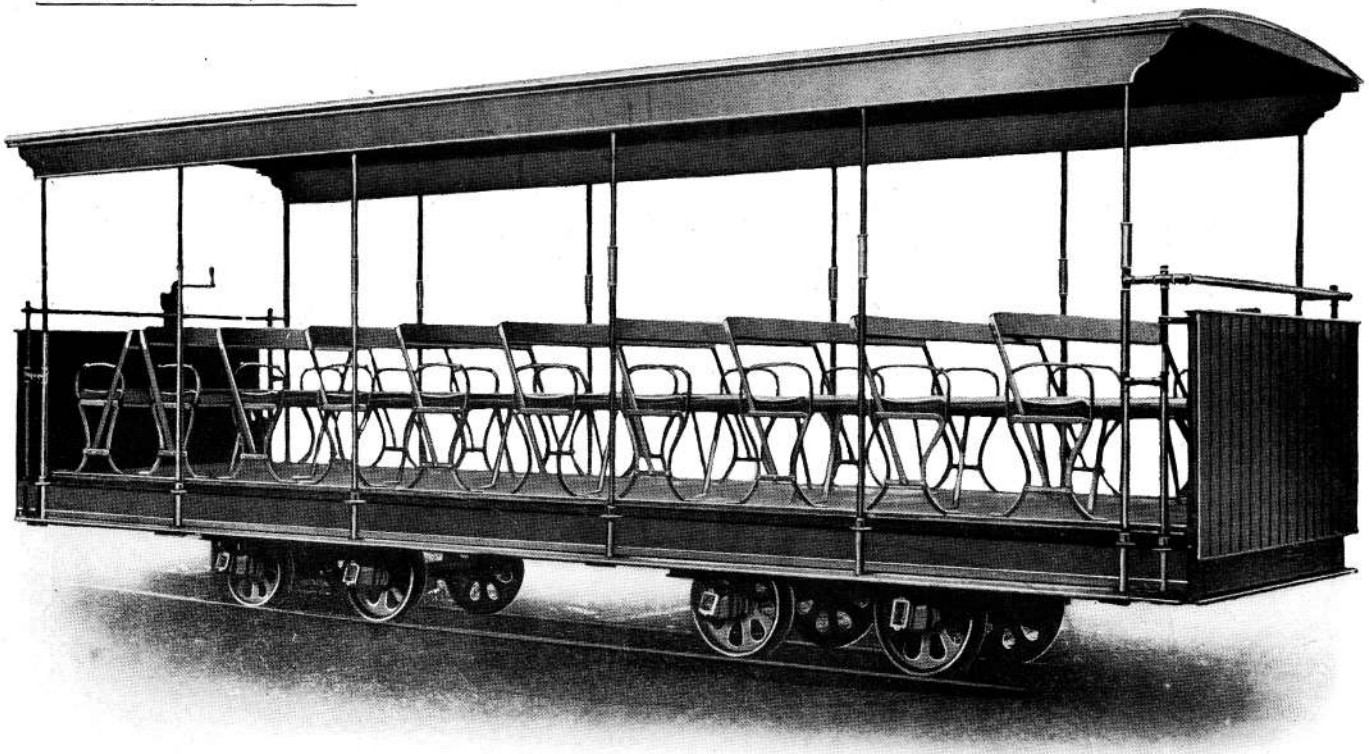
STANDARD NARROW GAUGE 40 H.P. INTERNAL COMBUSTION LOCOMOTIVE, also made in the following sizes : 25 h.p., 30 h.p., 38 h.p., 45 h.p., 55 h.p., 65 h.p., 70 h.p., 95 h.p., 120 h.p., 150 h.p., 170 h.p. ; any gauge from 2ft. to 5ft. 6in.



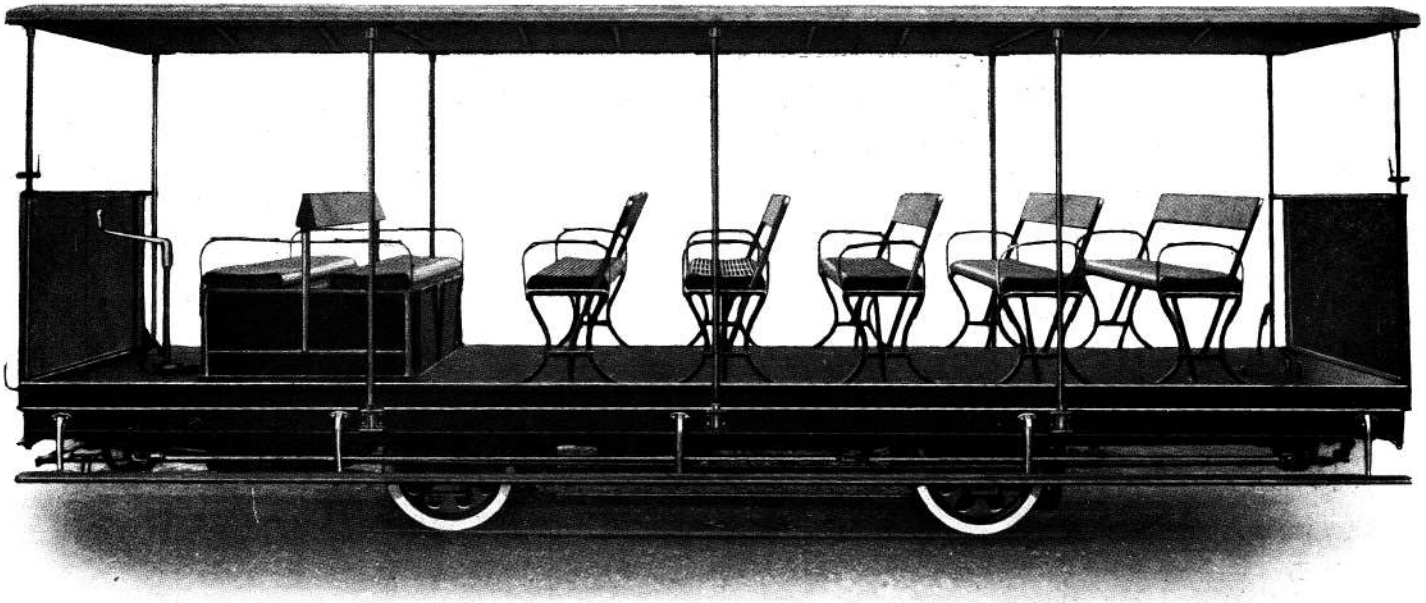
STANDARD MAIN LINE SHUNTING LOCOMOTIVE, made in the following sizes :
55/60, 65/70, 70/75, 95/100, 120/135, 150/160, 170/180 H.P.



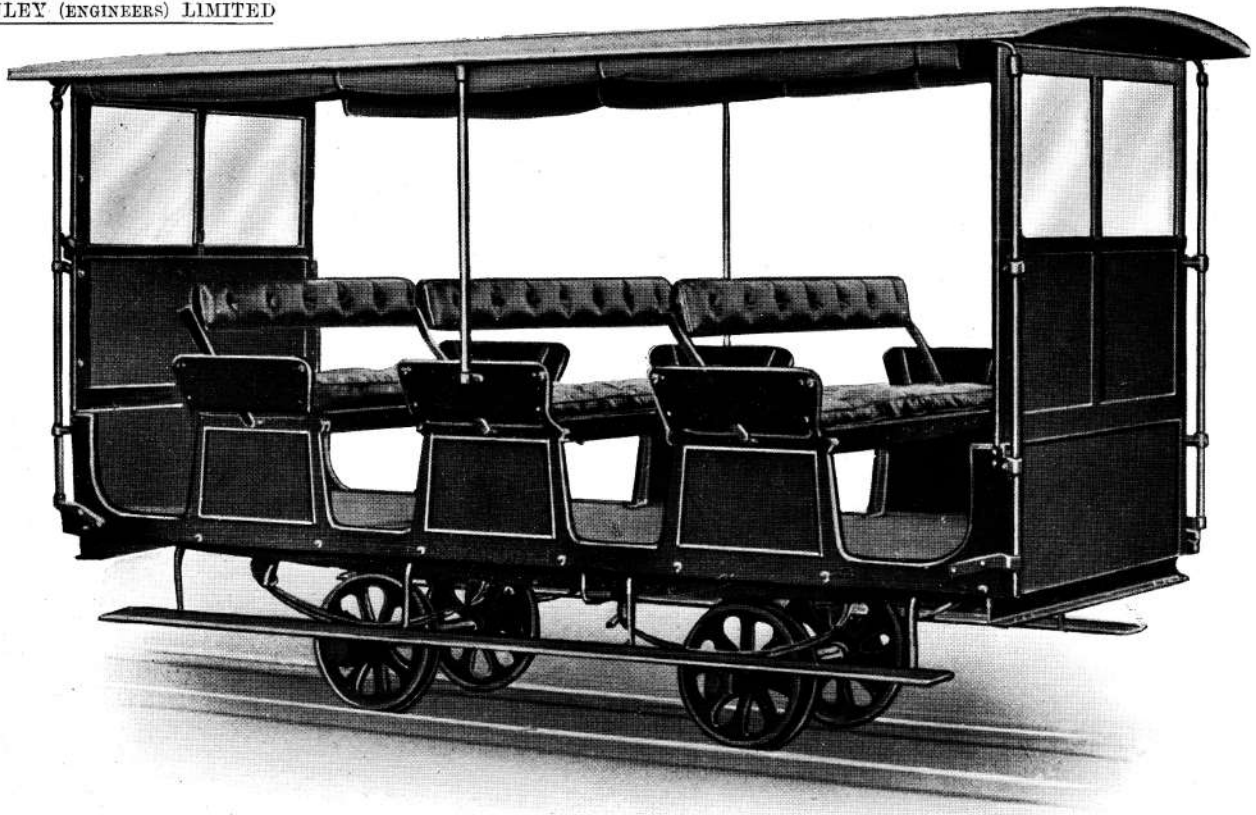
OPEN BOGIE PASSENGER CAR with Reversible Seats—Can be arranged for either mechanical or animal traction, and designed to carry any number of passengers.



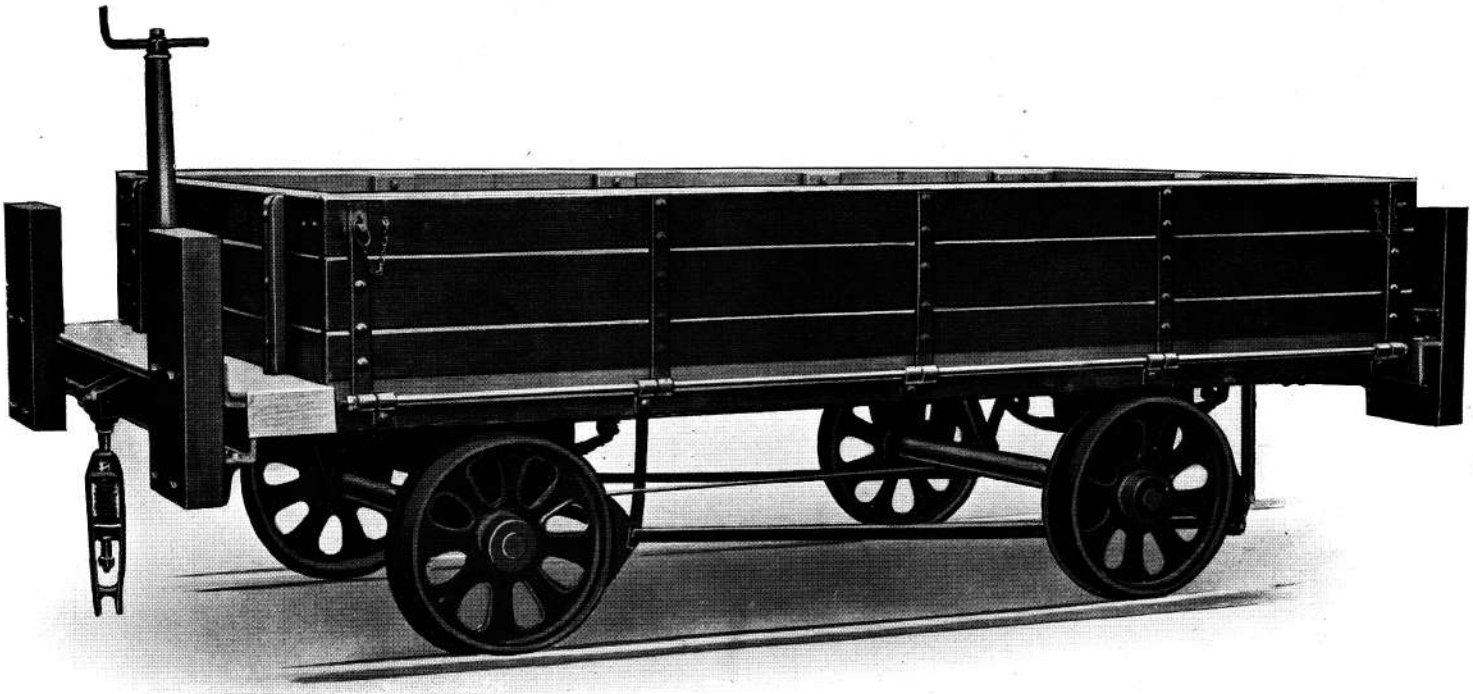
OPEN BOGIE PASSENGER CAR with Reversible Seats—Can be arranged for either mechanical or animal traction, and designed to carry any number of passengers.



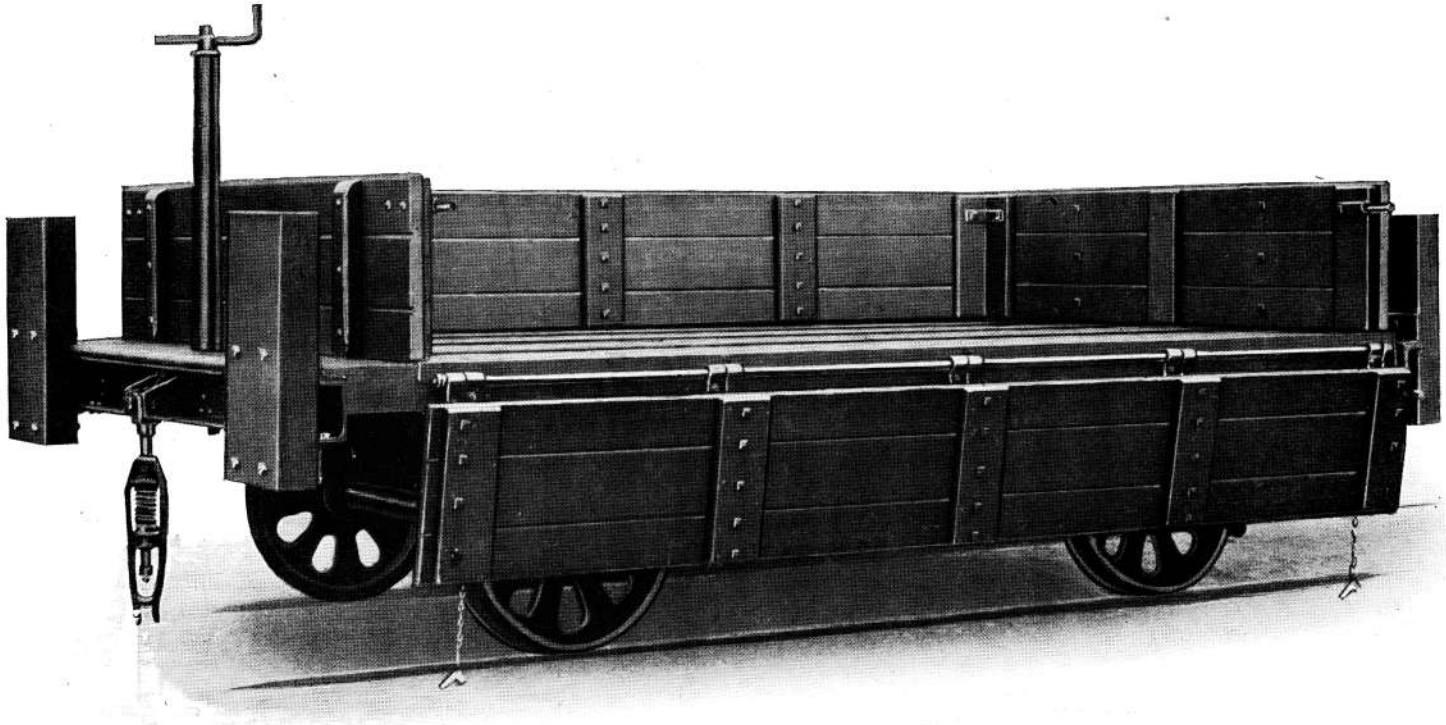
OPEN FOUR-WHEELED PASSENGER CAR.



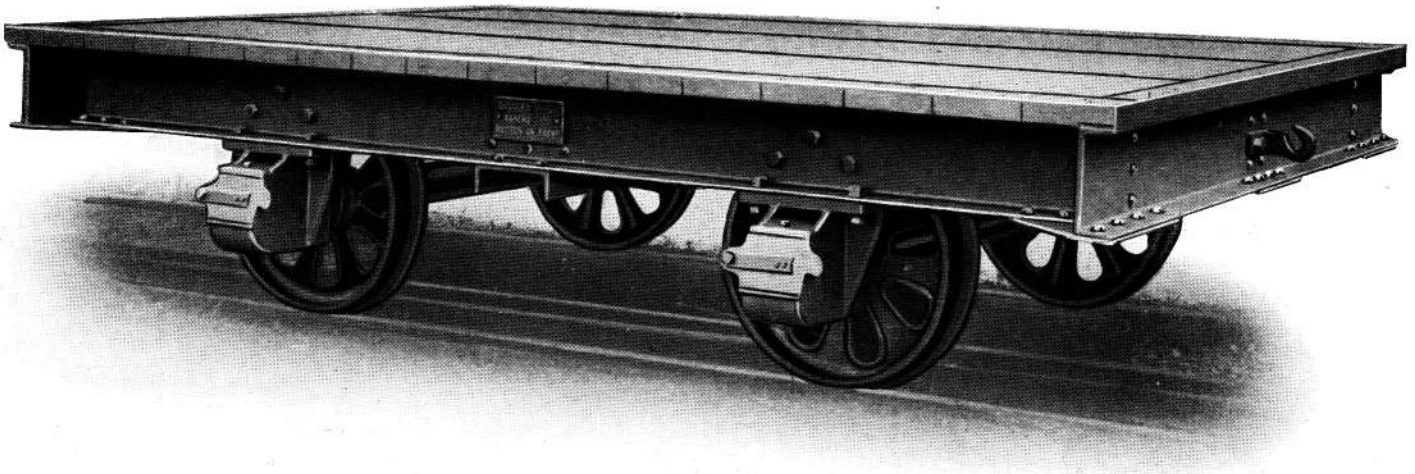
OPEN FOUR-WHEELED PASSENGER CAR with upholstered seats and back rests.



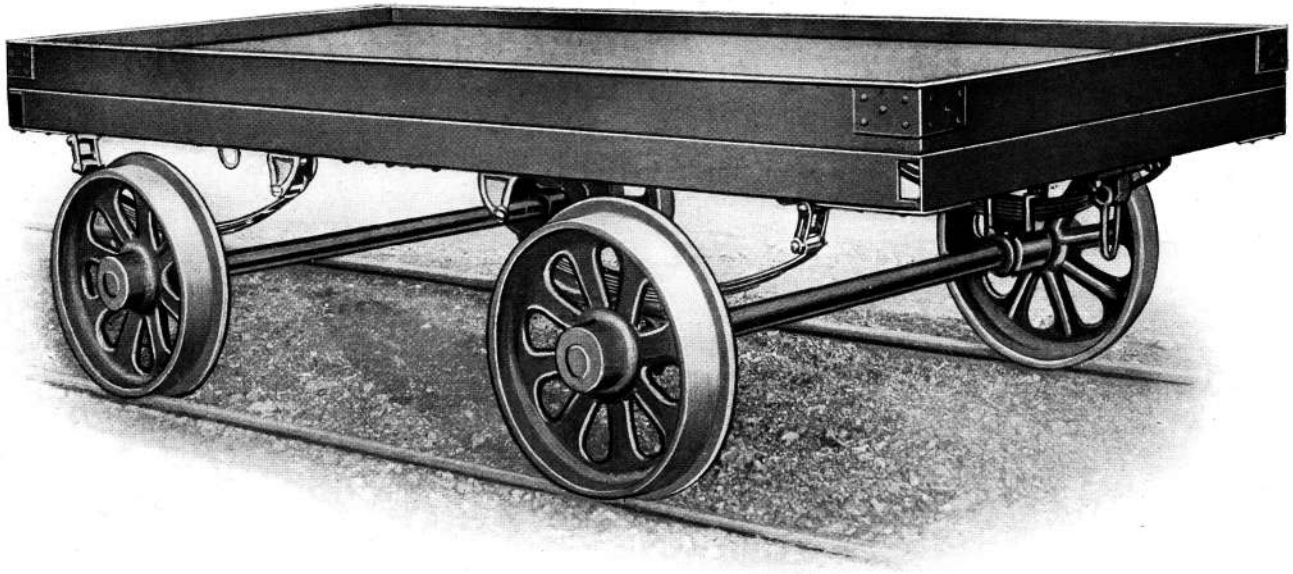
OPEN LOW-SIDED GOODS WAGON fitted with hand brake, and can be constructed or any gauge and capacity.



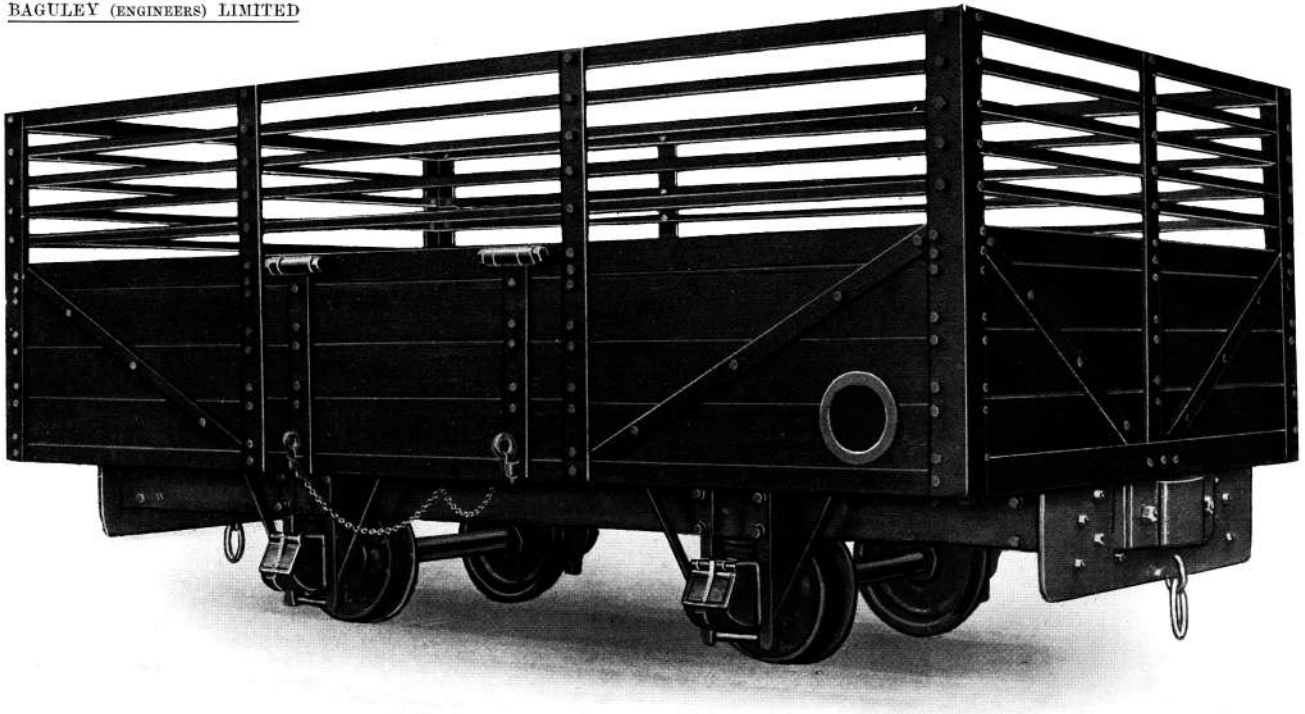
OPEN LOW-SIDED GOODS WAGON fitted with hand brake, and can be constructed for any gauge and capacity.



10-*TON PLATFORM WAGON for use in Works.*

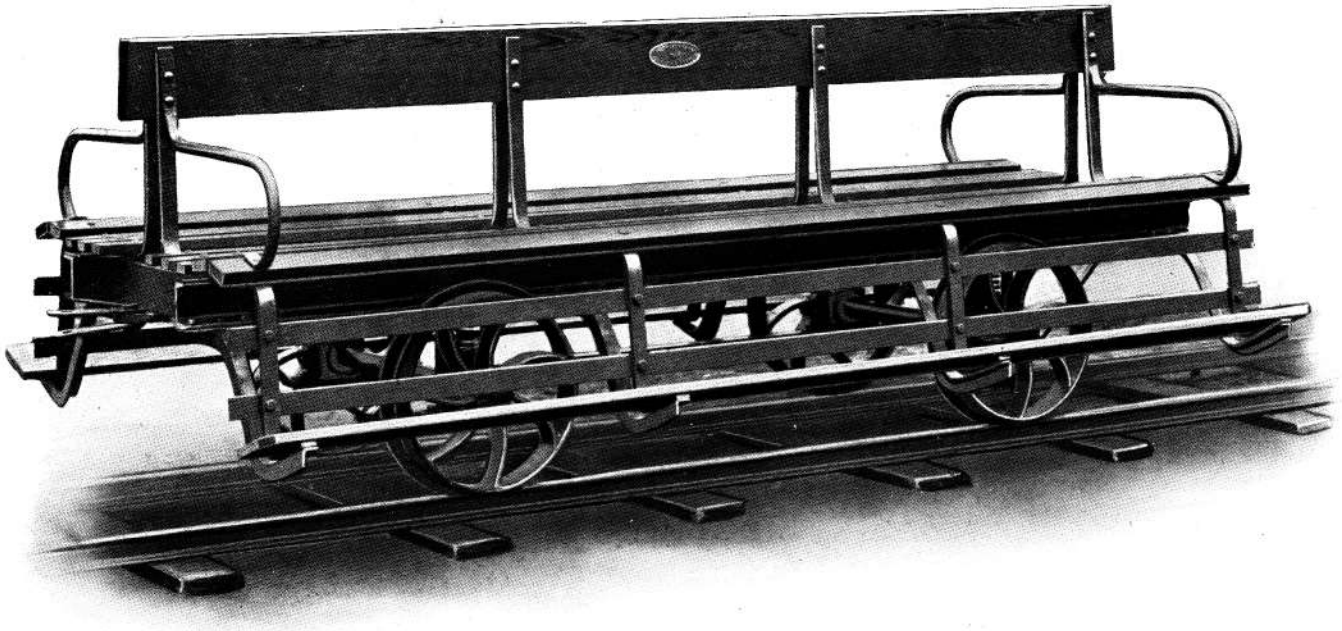


LIGHT PLATFORM WAGON, to carry 10–15 *cwt.*

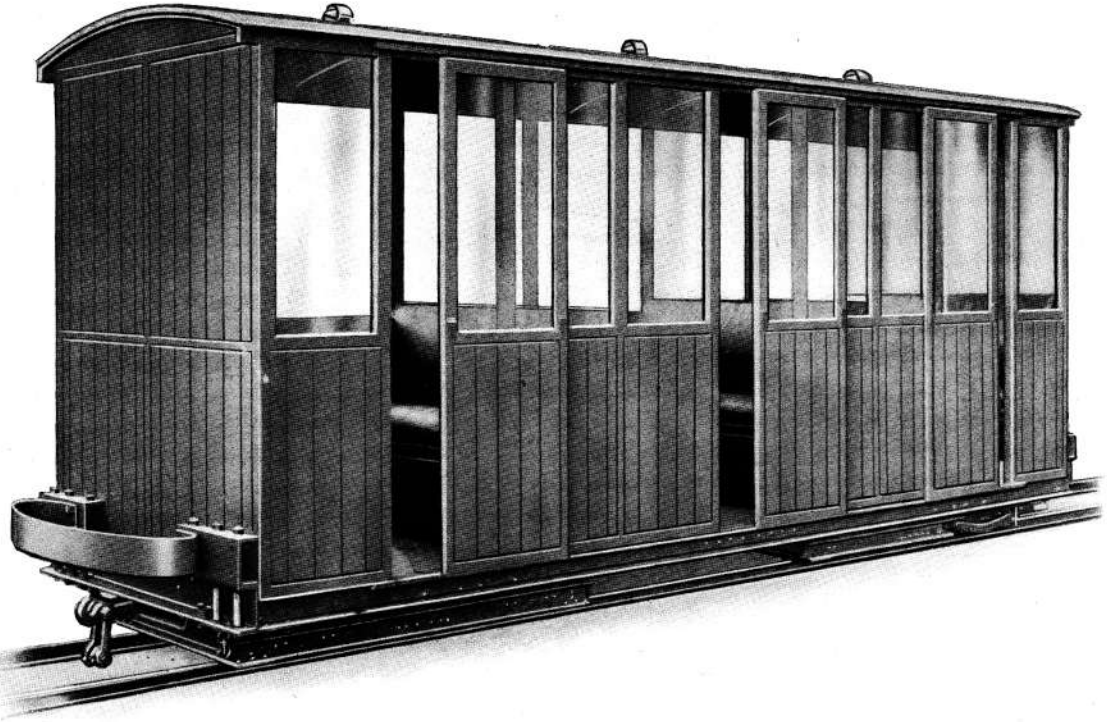


OPEN GOODS WAGON with side doors and lattice frame.

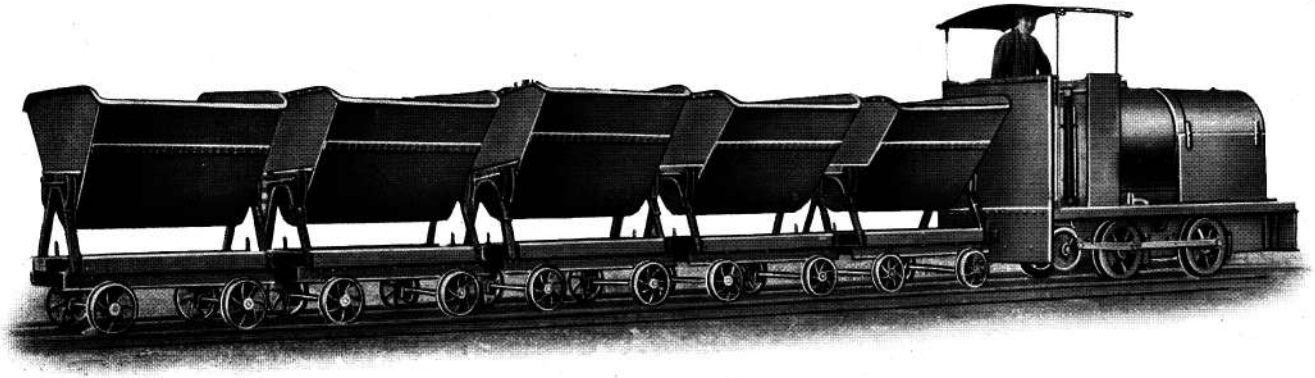
STEEL TIPPING WAGON, made in the following sizes :—
13½, 20, 27, 30, 35, 40 *and* 60 *cubic ft. capacity, and made for any gauge.*



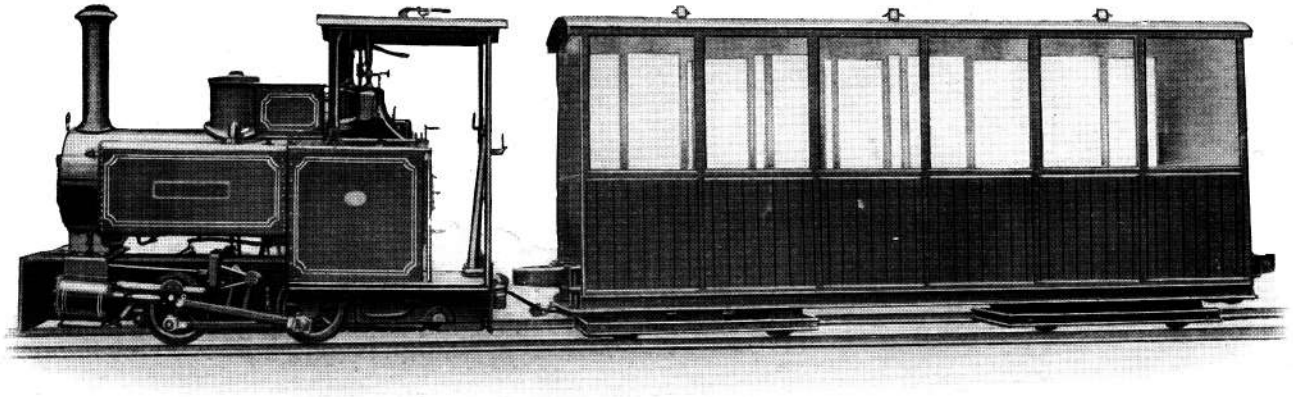
JAUNTING CAR for horse or mechanical traction, made for any number of passengers.



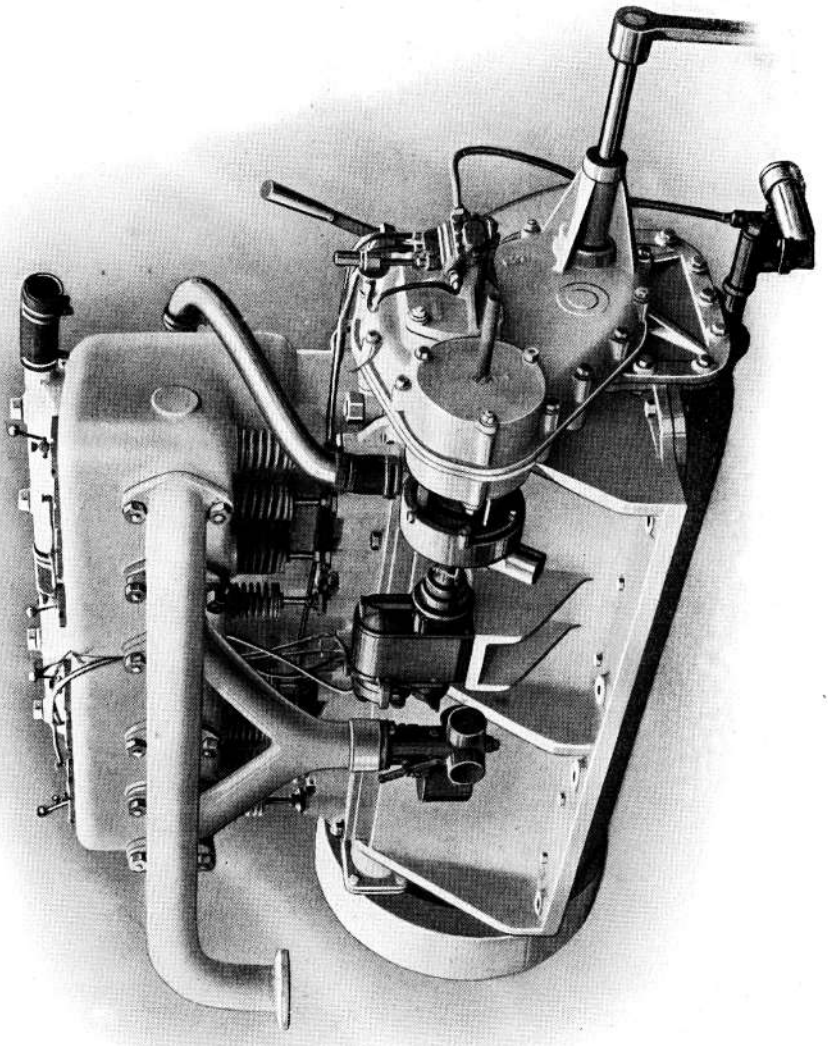
SPECIAL TYPE LIGHT BOGIE PASSENGER COACH to carry 20 passengers.



INTERNAL-COMBUSTION LOCOMOTIVE Hauling Tip Wagons.

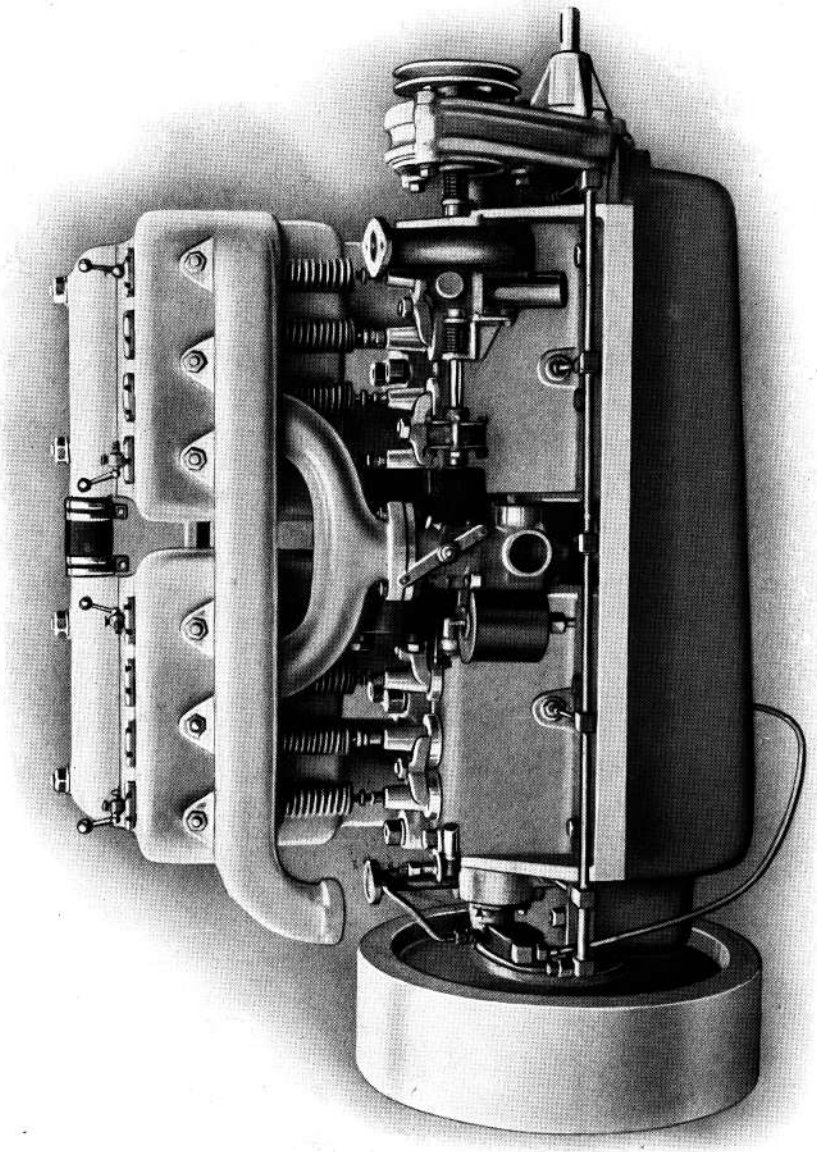


LIGHT TANK LOCOMOTIVE AND PASSENGER COACH for light railway.

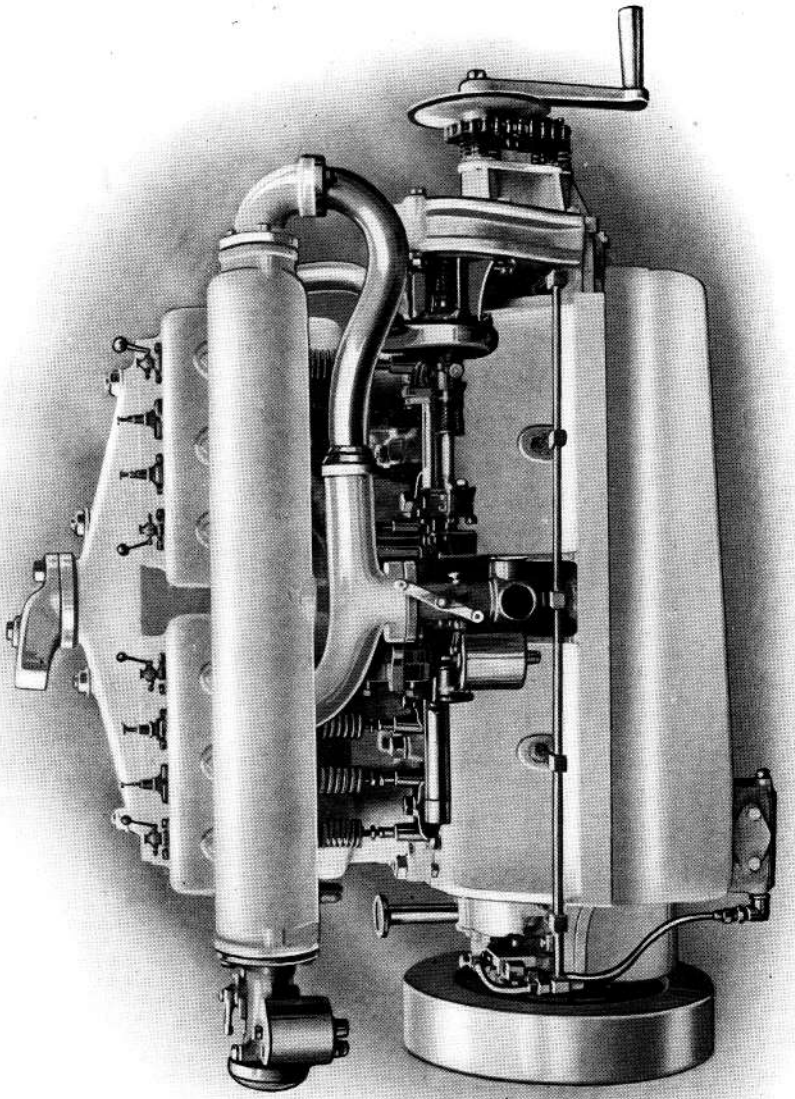


INTERNAL COMBUSTION ENGINES, Four Cylinders 6 *by* 8½*in.*
100-105 *h.p.*

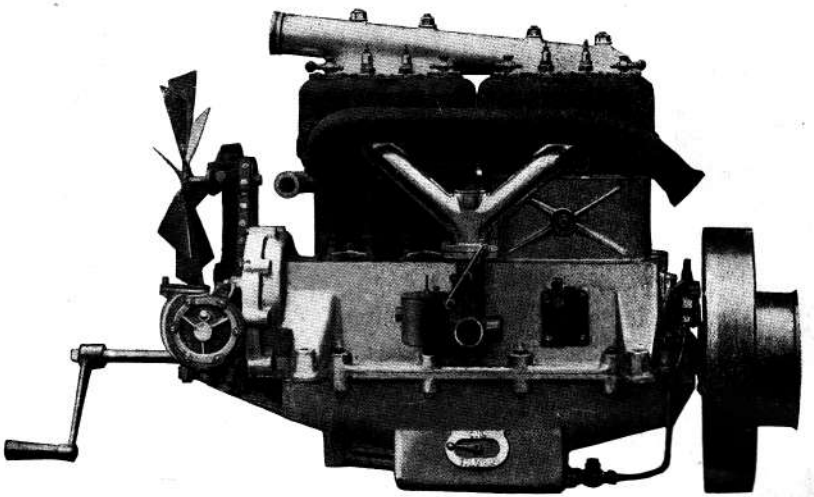
Six Cylinders 6 *by* 8½*in.*, 140-150 *h.p.*
Six Cylinders 6½ *by* 8½*in.*, 160-170 *h.p.*



INTERNAL COMBUSTION ENGINE, Cylinders 5in. diameter by 6in. stroke, 50-55 h.p.; Cylinders 5½in. diameter by 6in. stroke, 60-65 h.p.; six Cylinders 5 by 6in., 70-75 h.p.



INTERNAL COMBUSTION ENGINE, Four Cylinders
$4\frac{1}{8}$ *by* 5*in.*, 30-35 *h.p.*
$4\frac{3}{4}$ *by* $5\frac{1}{2}$*in.*, 40-45 *h.p.*
Six Cylinders $4\frac{1}{2}$ *by* 5*in.*, 45-50 *h.p.*



INTERNAL COMBUSTION ENGINE, Four Cylinders
$3\frac{3}{16}$ by $5\frac{1}{8}$in., 20-25 h.p.
$4\frac{1}{4}$in. diameter by 5in. stroke, 25-30 h.p.

INDUSTRIAL LOCOMOTIVE SOCIETY