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LOCOMOTIVE PRODUCTION ENGINEERING: DEPTH CLASSIFICATION.

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Works out a scheme for the Depth Classification of the subjects going with the (BC) "Production Engineering of Locomotive". The schedules given are confined to the First Characteristics for [1P]. Gives a list of 24 selected examples classified according to the scheme. Demonstrates the use of the connecting symbol '=' in constructing isolate numbers based on units of measure. Comments on the Feature Headings.

ABBREVIATIONS USED

(A1) = Array of Order 1	[1P] = [P] of Round 1
(A2) = Array of Order 2	(Q1) = Quasi Isolate(s)
(A3) = Array of Order 3	Tel = Telescoping of
(AD) = Alphabetical Device	Tel 1 = Telescoping 1 of
(BC) = Basic Class(es)	Tel 2 = Telescoping 2 of
(IN) = Isolate Number(s)	Tel 3 = Telescoping 3 of
[P] = Personality Facet	

1 INTRODUCTION

The construction of a scheme for the Depth Classification of the subjects going with the (BC) "Production of Power-Production-Machinery", such as the Reciprocating Internal Combustion Engine [22] and Boiler [12] has been demonstrated. This paper continues the demonstration of the application of the new methodology of design [17] to the construction of a depth schedule for the classification of the subjects going with the (BC) "Production of Locomotive".

This paper confines itself to the schedule of [1P]. The schedule is provisional.

2 DEFINITION

21 MACHINE

A Machine is a combination of rigid or resistant bodies having definite motions and capable of performing useful

work. The term 'Mechanism' is closely related but applies only to the physical arrangement that provides for the definite motions of the parts of a machine. A machine is an assembly of one or more mechanisms [10].

22 MACHINERY

A Machinery is a group of parts arranged to perform a useful function. Normally some of the parts are capable of motion; others are stationary and provide a frame for the moving parts. The terms 'machine' and 'machinery' are so closely related as to be almost synonymous; however, the term 'machinery' has a plural implication, suggesting more than one machine [11].

23 ENGINE

An Engine is a machine designed for the conversion of energy into useful mechanical motion. The principal characteristic of an engine is its capacity to deliver appreciable mechanical power, as contrasted to a mechanism such as a clock or an analog computer whose significant output is motion. By usage, an engine is usually a machine that burns or otherwise consumes fuel as differentiated from an electric machine that produces mechanical power, without altering the composition of matter [6].

24 LOCOMOTIVE

1 A machine used to move trains on railway tracks [25].

2 A self-propelled engine or vehicle; specifically a steam engine mounted with its boiler and accessories on a truck or trucks designed to run on gauged rails, for hauling cars, wagons, etc, for the conveyance of passengers or freight; hence, any motor running on track, for hauling [24].

3 A vehicle supported on wheels, capable of self-propulsion by converting heat or electrical energy into mechanical power for the purposes of moving railway cars over rails [7].

241 Steam locomotive

A steam-engine and boiler integrally mounted on a frame which is fitted with road wheels driven by the engine. The term is usually restricted to locomotives used to haul passenger or goods traffic on a railway [1].

242 Diesel locomotive

A locomotive powered by a diesel or compression-ignition engine geared to the driving wheels [2].

243 Diesel-electric locomotive

A locomotive in which the motive power from a diesel

engine is used to drive an electric generator which supplies electric motors connected to the driving axles [3].

244 Diesel-hydraulic locomotive

A locomotive powered by a diesel engine, the latter being connected by universal drive shafts to the hydraulic transmission system mounted on the truck between the two driving wheels [8].

245 Turbine locomotive

A locomotive powered by a steam or gas turbine, the power being transmitted to the driving wheels through an electric transmission system [9]. The turbine locomotive is sometimes called Turbine-electric locomotive.

3 BASIC CLASSES IN 'D ENGINEERING'

The first few (BC) in the schedule of Main Class 'D Engineering' occurring in (A1) are as follows:—

- D Engineering
- D6 Power production
- D7 Service production
- D7Z Commodity production
- D9A Power-production machinery
Tel (A3) into (A2) begins
- D9C Mechanical-power-production machinery
- D9J Thermal-power-production machinery
- D9M Electrical-power-production machinery
- D9N Electronic-power-production machinery
Tel (A3) into (A2) ends

31 BASIC CLASS FOR 'LOCOMOTIVE'

Locomotive-Production Engineering forms a subclass of the (BC) Production Engineering of Mechanical Power Production Machinery. It is itself a (BC). The following is the chain containing it:

- D9C Mechanical-power-production machinery
Tel (A4) into (A2) begins
- D9D Hoisting and conveying machinery
- D9E Propulsion machinery
Tel (A5) into (A2) begins
- D9F Land traction machinery
- D9F1 Automotive engine
- D9F4 Locomotive
Tel (A6) into (A3) begins
- D9F5 Steam locomotive

D9F6	Electric locomotive
D9F7	Reciprocating internal combustion engine <i>Tel (A7) into 1 (A3) begins</i>
D9FA	Petrol locomotive
D9FB	Diesel locomotive
D9FC	Diesel-electric locomotive
D9FD	Diesel-hydraulic locomotive <i>Tel 1 (A7) into (A3) ends</i>
D9FF	Turbine engine <i>Tel 2 (A7) into (A3) begins</i>
D9FG	Steam turbine locomotive
D9FJ	Gas turbine locomotive <i>Tel 2 (A7) into (A3) ends</i>
D9FN	Nuclear locomotive <i>Tel (A6) into (A3) ends</i>
D9G	Marine engine
D9H	Aero-engine <i>Tel (A4) into (A2) ends</i>

32 CHARACTERISTIC FOR DIVISION

The (BC) 'D9D4 Locomotive' has been divided into further (BC) on the basis of the Characteristic 'By engine(s) supplying power'.

33 SEQUENCE OF (BC)

The sequence of the (BC) has been derived by applying the Principle of Later-in-Time [18]. The (IN) have been assigned with the help of Scheduled Mnemonics [19].

4 FIRST CHARACTERISTICS

Some of the possible First Characteristics—that is, (Q1)—used as the basis for the classification of subjects going with the (BC) 'Production Engineering of Locomotive' and its sub-classes, are given in Table 1 in Sec 41. These (Q1) have been selected by blending the *a priori* and pragmatic approaches. The latter consisted of examining about 200 recent articles on the subject. Table 1 also indicates, wherever helpful and necessary, the second and later order (Q1). The (Q1) other than those of Order 1 are indicated by appropriate indentation.

41 TABLE 1. QUASI ISOLATE

SN	Sector	Quasi Isolate	SN	Sector	Quasi Isolate
1	(S-(A))	By Brand	30		By Driving wheel
2	(S-(I))	By Country of make	31		By Pilot wheel
			32-44		By Propulsion unit
3-5	(S-(a))	By purpose			(For gas turbine)
3		By Distance	32	(S-9ZA)	By Brand
4		By Service line	33	(S-9A)	By Method of power increase
5		By Entity transported			
6-8	(S-ZA)	By Environment	34		By Brake horse power
6		By Resistance			By Speed
7		By Altitude	35		By Fuel
8		By Latitude	36		By Cycle
9-11		By Cab	37		By Shaft arrangement
9	(S-Z9I)	By Number	38		By Number of turbine stage
10	(S-Z9a)	By Structure			By Number of combustion chambers
11		By Position	39		By Kind of combustion chamber
12-13		By Bogie of loco			By Compressor type
12		By Articulation	40		By Number of compressor stage
13		By Number			By Cooling method (For petrol/diesel engine)
14		By Mounting of engine	41		By Brand
	(S-ZzA)	By Brand			By Number of engines
15	(S-Za)	By Gauge of track	42		By Method of power increase
16		By Weight of locomotive	43		By Brake horse power
17		By Weight on drivers	43		By Compression ratio
18		By Axle load	44		By Cycle
19	(S-A)	By Wheel base	45-60		By Number of cylinders
20		By Rail clearance			By Bore diameter
21		By Height over Cab			By Cylinder arrangement
22		By Overall width	45	(S-9ZA)	By Crankshaft speed
23		By Length over buffer	46	(S-9A)	By Fuel tank capacity
24		By Overall length	47		
25		By Maximum radius of negotiable curve	48		
26		By Mean maximum speed	49		
27		By Number of the gear	50		
			51		
28-29		By Tractive effort			
28		By Continuous tractive effort,	52		
		at Speed	53		
29		By Starting tractive effort	54		
30-31		By Arrangement of wheel	55		

SN	Sector	Quasi Isolate	SN	Sector	Quasi Isolate
56		By Displacement	86		By Frequency of supply
57		By Stroke distance			
58		By Fuel injection system	87	(S-99a)	By Position of cylinder
59-60		By Cooling method	88	(S-91)	By Number of cylinders
59		By Device			
60		By Fluid	89	(S-9a)	By Temperature of unit
61-81		By Boiler			
61		By Brand	90	(S-1)	By Number of axles
62		By method of increasing efficiency	91	(S-zZ1)	By Driving wheel diameter
63		By Capacity	92-97	(S-zA)	By Gear drive system
64		By Design efficiency	92		By Kind of drive
65		By Thermal efficiency	93		By Gear box mounting
66		By Temperature	94		By Changing of gear
67		By Fuel			
68		By Rate of combustion	95		By Gear reduction ratio
69		By Fuel consumption	96		By Number of gear
			97		By Stall torque ratio
70		By Steam consumption	98-104		By Transmission system
71-72		By Size			
71		By Width	98	(S-zzA)	By Brand
72		By Height	99	(S-zz1)	By Number of transmission speed
73-75		By Construction			
73		By Support			
74		By Refractory wall	100	(S-za)	By Mode of operation
75		By Tube positioning	101		By Type of transmission
76		By Furnace	102		By Friction clutch
77		By Tube	103		By Stage
78		By Header	104		By Coupling
79		By Firing	105	(S-z01)	By Method of Starting
80		By Draught			
81		By Control of Temperature	106-113	(S-a)	By Control
			106		By Brand
82-86		By Electric/Electronic equipment	107		By Power
			108-113		By Entity controlled
82-86		By Motor			
82	(S-99ZA)	By Brand	108		By Coolant temperature
		By Revolution per minute	109		By Coolant level
83	(S-99A)	By Number of motors	110		By Lubrication
84		By Mounting of motors	111-112		By Braking system
85		By Phase	111		By Braking

SN	Sector	Quasi Isolate	SN	Sector	Quasi Isolate
		mechanism	115		By Lighting
112		By Braking force	116 117		By Voltage
113		By Speed			By Heating and ventilation
114-118		By Facility	118		By Visibility
114		By Track crossing			

42 SEQUENCE OF THE (QI)

There being a large number of (QI), it was helpful to apply the Group Strategy [13]. That is,

- 1 To group the (QI) into a few groups;
- 2 Derive a helpful sequence among the groups by applying the Wall-Picture Principle to a pair of groups at a time; and
- 3 To derive a helpful sequence among the (QI) in each group by applying the Wall-Picture Principle to a pair of (QI) at a time.

43 GROUPING OF (QI)

In making groups of (QI) in each group some affinity is looked for among the (QI). It is sometimes difficult to sense this affinity. In an earlier paper [14] it was mentioned that in subjects going with the (BC) "Commodity Production Engineering" "formation of groups such as the following would be convenient:

- Name-associated
- Purpose-associated
- Whole-machine-design associated
- Organ-design associated
- Operation-associated

In the present schedule) the (QI) were grouped as follows

Group N	Kind of Group	S Number of (QI) in Table I
1	Personality-associated	1-8
2	Attribute and Material-Matter Associated	9-103
21	For locomotive as a whole	9-29
22	For organs	30-103
3	Energy-associated	104-118

In the case of the second and later order (Q1) associated with each of the Organ-associated first order (Q1), it has been found possible to derive a Personality, Matter, Energy sequence for them. A more detailed paper on the grouping of (Q1) and deriving a helpful sequence among them according to this methodology, is in preparation. The sequence of the (Q1) arrived at is deemed to satisfy the Wall-Picture Principle.

44 SUPER-IMPOSITION

If a subject warrants the combination of two or more isolates in [1P] derived on the basis of different (Q1), the resulting (IN) will be a complex superimposed isolate.

5 NOTATION

51 ALLOCATION OF SECTORS TO (Q1)

The provisional allocation of the sectors to the (Q1) is given in column 2 of the Table I in Sec 41. In assigning the sectors the following factors were taken into consideration:

1 The sequence of the (Q1) arrived at in the idea plane should be maintained in the notational plane;

2 The number of digits in (A1) should not normally exceed 3;

3 In order to facilitate the use of mnemonics, some of the (Q1) should preferably be allocated sectors in which the first significant digit is an Hindu-Arabic numeral;

4 In order to facilitate the use of (AD) or the addition of figures in Hindu-Arabic numerals for isolates derived should preferably be allocated sectors in which the first significant digit is a Roman capital letter;

5 Gaps should be left among the sectors allocated such that a new (Q1), to be interpolated in future, can be given a sector without having to disturb the pattern of allocation of sectors now obtained;

6 Frequently occurring isolates should get, as far as possible, shorter notation than those occurring comparatively less frequently;

7 If the number of isolates derived on the basis of a (Q1) is comparatively large (eg more than 8), then a sector with a broader base should preferably be allocated to that (Q1); and

8 One and the same sector may be allocated to two or more consecutive (Q1), in order to make full use of each of the sectors allocated. But, at the same time, care has to be taken not to jeopardise the future interpolation or extrapolation, in the appropriate filiatory sequence of any isolate(s) derived on the basis of any of the (Q1) enumerated or any other (Q1) that

may have to be accommodated in the future.

91 The isolates in the schedule for organs have been allocated the following sectors [23]:

SN	Organ	Sector	N of Array (IN)
1	General-purpose Machine Element (ME)	(S-a) to (S-za)	44
2	Common Organ Isolates (Other than ME)	(S-zza)	22
3	Organ of remove 5	(S-zz1) to (S-zzA)	31
4	Organ of remove 4	(S-z1) to (S-z9A)	61
5	Organ of remove 3	(S-zA) to (S-zZA)	76
6	Organ of remove 2	(S-1) to (S-9:A)	220
7	Organ of remove 1	(S-A) to (S-ZZA)	235

92 The isolates in the schedule of organs of remove 2 have been grouped according to their general functions [21].

93 The schedules for [P] of levels later than [1P1] have been telescoped into [1P2]. But [1P2] is not telescoped into [1P1]. If in a subject, an isolate in the schedule of [1P1] or [1P3] etc is to be directly attached to the (BC) without the occurrence of an isolate from the schedule of [1P1], then a '0' (Zero) should be added immediately preceding the (IN) from [1P2] etc [15].

52 EXTENSION OF THE USE OF SYMBOL "="

The use of the connecting symbol "=" for connecting the isolate numbers got by applying the (AD) to multinomials has been demonstrated [4]. It has been found convenient to extend the use of this symbol to connect the members of units of measure, and the integral part and the decimal part in a number. For example, if a measure is expressed in feet and inches, then the part expressed in feet and the part expressed in inches can be connected by "=" symbol:

5=6 can represent 5 feet 6 inches.

Similarly, if a measure is expressed in tons and cwt, then

15=6 can represent 15 tons 6 cwt.

Also, if a measure is expressed in decimal notation, the figures on either side of the decimal point may be connected by the symbol "=" . For example,

525=3 can represent 525-3

Such extension of the use of the symbol "=" is demonstrated in several of the Class Numbers in Sec 8.

6 INDEX TO SCHEDULE

Note.—1 The (IN) given against an entry is the (IN) assigned to that isolate in the schedule in Sec 7.

2 (Org) = Organ. (QI) = Quasi Isolate.

Acceleration	Bare
register (Org) 5C	plate water-cooled wall boiler 9JF1
resistance ZTP	tube water-cooled wall boiler 9JF2
Air	Battery starting z061
box (Org) 258	Bed frame (Org) 11
control u8	Bell (Org) 982
cooled	Bent tube boiler 9F6
gas turbine 9B8	Bituminous coal boiler 9T3
diesel engine 9B8	Bogies, Number of (QI) Z1
petrol engine 9B8	Boiler 9A
wall, Boiler with 9JJ	van heating facility a44
filter (Org) 428	Bore diameter (QI) for
heater, Boiler with 9ZA	diesel engine 9J
intake equipment (Org) H	petrol engine 9J
Alarm equipment (Org) 984	Box (Org) 25
Alternator (Org) K2	Box header, Boiler with 9E3
Altitude (QI) ZD	Brake
Annular combust chamber,	horse power of
Gas turbine with 9E5	diesel engine (QI) 9P to 9R
Anthracite coal boiler 9T1	gas turb engine (QI) 9R
Armature on axle drive zJ	petrol engine (QI) 9P to 9R
Articulation (QI) Z6	(Org) 58
Arrangement of wheel A to K	Breaking
Ash pan (Org) 2F	force m
Attenuation, Boiler with 9B5	mechanism n
Attenuation, Equipment for (Org) 9F	system (QI) k
Automatic	Branch line service (n)
control x	Brand (QI) for
of temp, Boiler with 9BD	boiler 9ZA
firing, Boiler with 9DD	control yA
shut down for	diesel engine 9ZA
coolant level control q6	gas turbine engine 9ZA
coolant temp control r6	locomotive (A)
lubrication control p6	motor 99ZA
transmission zr	petrol engine 9ZA
Axial flow compressor, Gas	transmission system zZA
turbine with 9D2	Brick set
Axle	independent support, Boiler with
load (QI) Za	9K26
mounted	structural support, Boiler with
gearbox zE	9K23
motor 99M1	Brown coal boiler 9T6
Number of (QI) 1	
	Cab (Org) C
Balanced draft boiler 9C8	(QI) Z9a
Bar (Org) 143	Camshaft (Org) 71

- Can type combust chamber, equipment (Org) 96
 Gas turb with 9E2 method for
- Capacity, Boiler (Q1) 9Y diesel engine (Q1) 9B
 Carburetted inject syst, gas turb (Q1) 9B
 Diesel eng with 9C7 petrol engine (Q1) 9B
 Petrol eng with 9C7 Counter weight (Org) 82
 Casing (Org) 2 Country of make (Q1) (1)
 Centre cab Z9d Coupling, Torque converter zb
 Centrifugal compressor, Crank (Org) 55
 Gas turb with 9D1 Crankcase (Org) 23
 Chain grate firing, Boiler with 9D1 Crankshaft
 Close spaced tube wall, (Org) 73
 Boiler with 9J2 speed of
- Closed cycle, Gas turbine with 9K6 diesel engine (Q1) 9G
 Coal using gas turb eng 9M11 petrol engine (Q1) 9G
 Coal slurry using gas turb eng 9M12 Cross tracking 9B
 Coke Curve resistance ZTJ
 Boiler using 9TE Cycle of
 breeze, Boiler using 9TK diesel engine (Q1) 9L
 Coking grate firing, Boiler with 9D3 gas turbine (Q1) 9K
 Collective drive zX petrol engine (Q1) 9L
 Combination furnace, Boiler with 9HJ Cycle-cooling, Gas turb with 9B7
 Combustion Cyclone furnace, Boiler with 9HF
 chamber of gas turb (Q1) 9E Cylinder
 Number of (Q1) 9F arrangement in
 rate for boiler (Q1) 9R diesel engine (Q1) 9Gz
 Common organ isolate zza petrol engine (Q1) 9Gz
 Commuter service (d1) Number of (Q1) 9I
 Compound engine 98A of diesel engine (Q1) 9K
 Compression ratio for of petrol engine (Q1) 9K
 diesel engine 9M (Org) 22
 petrol engine 9M Position of (IQ) 99a
 Compressor
 assisted
 diesel engine 9S1 Damper bypass, Boiler with 9B
 lighting a55 Design pressure of boiler (Q1) 9X
 petrol engine 9S1 Diameter
 (Org) 915 Driving Wheel (Q1) zZ1
 stage for gas turbine 9C Diaphragm (Org) 43
 type for gas turbine 9D Diesel
 Condensation equipment (Org) 97 electric locomotive D9FC
 Condenser (Org) 978 hydraulic locomotive D9FD
 Constant speed governor dl6 locomotive D9FB
 Continuous tractive effort (Q1) P,Q Differential
 Control (Org) 93; (Q1) aZ firing, Boiler with 9B3
 Construction of boiler (Q1) 9J supercharging
 Continuous port inject system of Diesel engine with 9S2
 diesel engine 9C7 Petrol engine with 9S2
 petrol engine 9C7 Direct
 Coolant acting governor dl
 level control (Q1) q coactact attemperation, Boiler with
 (Org) 967 9B52
 temp control (Q1) r drive zH
 Cooling fuel inject system
 device for Diesel engine with 9C1
 diesel engine (Q1) 9B4 Petrol engine with 9C1
 petrol engine (Q1) 9B4 Disc braking mechanism n5

- Distance (QI) (t)
 Door (Org) 18
 Double
 acting two-stroke
 diesel engine 9L22
 petrol engine 9L22
 bank cylinder arrangement
 Diesel engine with 9HB
 Petrol engine with 9HB
 Draught of boiler (QI) 9C
 Driving wheel F3
 diameter (QI) zZ1
 Drum
 attemperation, Boiler with
 brake n1
 9B53
 Dual
 fuel gas turbine 9MC
 shaft, Gas turb with 9J2
 Dutch oven, Boiler with 9HD
 Dynamic control t
- Economiser, Boiler with 9XC
 Effusion cooled gas turbine 9B2
 Electric locomotive D9F6
 Electrical
 control v
 equipment
 (Org) K
 (QI) 99A
 heating s46
 starting method z06
 transmission system zk
 Electronic equip (QI) 99A
 End cab Z9b
 Engine G
 Environment (QI) ZA
 Exhaust device (Org) Q
 Exit (Org) 18
 Extended surface water
 cooled wall, Boiler with 9JF3
 External furnace, Boiler with 9H5
- Facility (QI) a
 Fastening (Org) 3
 Feed heater (Org) 943
 Film-cooled gas turb 9B6
 Filter (Org) 42
 Fire box (Org) 945
 Firing rate control, Boiler with 9B6
 Flat stud welded boiler 9J4
 Flow measuring device (Org) 9B2
 Fluid
 coke, Boiler using 9TJ
 coupling transmission zb
- Fly wheel (Org) 83
 Force measuring device (Org) 9B3
 Forced draught, Boiler with 9C5
 Forward
 and reverse speed zz8
 speed zz2
 visibility facility a31
 Four
 cylinder engine 94
 stroke
 diesel engine 9L4
 petrol engine 9L4
 Frame
 mounting drive zN
 (Org) B
 Freight service (C)
 Frequency of motor (QI) 99D
 Friction clutch (QI) zf
 Front truck (QI) C1
 Fuel 955
 capacity of gas turb (QI) 9P
 for gas turb (QI) 9M
 inject equip (Org) M
 metering equip (Org) J
 storage (Org) 254
 tank capacity (QI) for
 diesel eng 9F
 petrol eng 9F
 Full stud wall, Boiler with 9J5
 Furnace of boiler (QI) 9H
- Gas turb
 assisted
 diesel eng 9SA
 petrol eng 9SA
 locomotive D9FJ
 Gaseous fuel, Gas turb using 9M8
 Gasolene, Gas turb using 9M52
 Gauge of track (QI) Zg
 Gear
 changing in
 movement zA
 stationery position zB
 drive sypt Z908
 Number of (QI) R
 Geared
 jackshaft drive zR
 quill drive zK1
 General purpose machine element
 (Org) a
 Generator (Org) K1
 Goods transport (C)
 Governor d
 (Org) 93A
 Grade resistance ZTM
 Gross resistance ZTB

Guard (Org) 9D1	Jack shaft and side rod drive zQ
	Joining (Org) 3
	Journal box (Org) 24
Hand	
firing, Boiler with 9DA	
rail (Org) 9D2	Kerosene, Gas turb using 9M55
wheel (Org) 93K	
Hard coal, Boiler using 9T7	Lead (Org) 92
Header of boiler (Q1) 9E	Leading wheel F1
Heat exchanger (Org) 961	Light
Heating	(Org) 9D5
equipment (Org) 94	weight Zf
facility a4	Lighting facility a5
Heavy locomotive Zh	Lignite, Boiler using 9T5
Height of boiler (Q1) 9M	Limited speed governor d15
High temp coke boiler 9TF	Liner 41
Hollow wall boiler 9JJ	Linkage drive zM
Hopper bottom furnace,	Liquid
Boiler with 9HM	cooled gas turb 9B5
Horizontal	mixture, Gas turb using 9M5
Cylinder arrangement	Load
Diesel engine with 9H1	distributing governor d8
Petrol engine with 9H1	limiting governor d6
firing, Boiler with 9D91	Locomotive D9F4
return tube boiler 9F2	Long distance service (v)
tube boiler 9F1	Low temp coke boiler 9TG
Hydraulic	Lubricant 9H5
control u5	Lubrication
speed control f	Equipment for (Org) 9H
transmission zj	level control (Q1) p
Hydromechanical transmission zg5	Lubricator (Org) 9H3
Ignition equipment (Org) 95	
Ignitron rectifier 99C3	Machine
In-line arrangement in	cabinet (Org) 27
diesel eng 9H	element (Org) a
petrol eng 9H	Main line service (m)
Incidental resistance ZTG	Manifold (Org) 928
Inclined tube boiler 9F5	Manual
Independent cab Z9j	control of temp, Boiler with 9BA
Indication equipment (Org) 98	starting method z02
Individual	transmission zm
drive zW	Measurement equipment (Org) 9A
universal rod drive zN	Mechanical
Induced draught, Boiler with 9C3	speed control e
Industrial use (g)	transmission zg
Inherent resistance ZTD	Medium heavy locomotive Zg
Inlet lead (Org) 921	Metered port inject
Inner liner (Org) 411	Diesel eng with 9C5
Inside cylinder 99b	Petrol eng with 9C5
Integral cab Z9g	Mixed
Internal	duty locomotive (J)
comb eng, Reciprocating D9F7	flow compressor, Gas turb with 9D4
furnace boiler 9H1	Moisture 9D5
shoe brake n1	Motion, Organ for 5
Inertial mechanism (Org) 8	Motor

- Frequency 99D
(Org) K8
Mounting of engine (QI) ZzA
Multi
disc brake n58
disc transmission z1Z
fuel, Gas turb using 9MJ
stage compressor gas turb 9C1Z
- Negotiable curve, Maximum
radius of (QI) XB
Non-articulated cab Zb
Nose suspension drive zG1
Nuclear locomotive D9FN
- Oil
Boiler using 9TM
cooled
diesel engine 9B3
petrol engine 9B3
- One
bogie engine Z1
cylinder engine 91
motor 99N1
stage transmission zd1
- Opposed firing, Boiler with 9D94
Organ, Common zza
Outer liner (Org) 415
Outlet lead (Org) 925
Outside cylinder 99f
- Pantograph (Org) 92G
Partition (Org) 142
Passenger transport (d)
Peat using boiler 9T8
Pendulum (Org) 86
Petrol locomotive D9FA
Phase of motor (QI) 99E
Pilot (Org) 9D8
Piston (Org) 61
Pneumatic
control u
speed control j
- Polar environment ZC8
Power for control s
Pressure measur equip (Org) 9B7
Pressurised control v7
Propulsion unit (QI) 9A
Protected tube water cooled
wall, Boiler with 9JF5
Protection, Equipment for (Org) 9D
Pulverised coal boiler 9T
Pump (Org) 914
Purpose (QI) a
Pushrod (Org) 65
- Quill drive zK
- Radiator
cooled
diesel engine 9BF
petrol engine 9BF
(Org) 965
- Rail clearance (QI) XH
Rearward visibility facility a36
Reciprocating internal comb engi
D9F7
Reciprocation, Equipment for (Org)
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Recirculation control of temp,
Boiler with 9B2
Rectifier 99C
(Org) K6
Reheater, Boiler with 9Zh
Relay type governor d2
Regenerative braking nB
Regulated entity (QI) b
Reservoir (Org) 25
Resistance (QI) ZT
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aB1
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Revolution of motor (QI) 99T
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Rocker (Org) 66
Rod (Org) 143
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Rotation, Equipment for (Org) 7
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anthracite, Boiler using 9Tz
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Shaft
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9D42
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 Signalling equipment (Org) 98
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 Stall torque ratio (Q1) z9a
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 Steam
 chest (Org) 254
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 locomotive D9F5
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 Stoker firing, Boiler with 9D
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 Stroke distance (Q1) for
 diesel engine 9D
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 Structural support, Boiler with 9K2
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 Sub-bituminous coal, Boiler using 9T4
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 Boiler with 9B54
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 boiler 9Zm5
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 Tender (Org) D
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 stage
 compressor, Gas turb with 9c3
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 Topping of boiler 9Zn
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 Trailing wheel F6
 Transfer mechanism (Org) 91
 Transformer 99B
 (Org) K3
 Transmission syst (Q1) za
 Travelling grate, Boiler with 9D2
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 Turbine
 engine D9FF
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 Turbo
 charged
 diesel engine 9S5
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 furnace, Boiler with 9HG
 Two
 bogies Z2
 cylinders 92
 disc transmission zf2
 motors 99N2
 phase motor 99E2

stage	Yoke drive zS
compressor gas turb	9C2
transmission zd2	
stroke	7 SCHEDULE
diesel engine 9L2	
petrol engine 9L2	
Underground service (p)	Foci in [P]
Universal rod drive zN	(S-a) to (S-za) General purpose Machine Element (ME)
	<i>Telescoping point</i>
	<i>Earlier level</i>
	(S-zza) Common organ isolates (other than ME)
V-type cylinder arrangement in	
diesel engine 9H3	
petrol engine 9H3	
Vacuum control u6	<i>Telescoping point</i>
Variable speed governor D14	<i>Earlier level</i>
Ventilated a48	Organ of remove 2
Ventilation, Equipment for (Org) 96	1 <i>By Support and structure</i>
Ventilator (Org) 968	11 Bed frame
Vertical	141 Wall
firing, Boiler with 9D93	142 Partition
tube boiler 9F3	143 Bar. Rod
Very light weight locomotive Ze	18 Door. Exit
Vibration absorber (Org) 9F5	2 <i>By Storage and Casing</i>
Visibility facility a2Z	22 Cylinder
Voltage for lighting (QI) a5B	23 Crankcase
	24 Journal box
	25 Reservoir. Box
	254 Steam chest
W-type cylinder arrangement in	254 Fuel store
diesel engine 9H4	255 Water tank
petrol engine 9H4	258 Air box
Wall (Org) 141	27 Machine cabinet
Warning system for	2F Ash pan
coolant	
level control q5	
temperature control r5	
lubrication control p5	3 <i>By Joining and fastening</i> (other than ME)
Water	
cooled	
diesel engine 9B5	4 <i>By Separation</i>
petrol engine 9B5	41 Liner
wall, Boiler with 9JF	411 Inner
tank (Org) 255	415 Outer
Weight	42 Filter
on drivers (QI) Zc	428 Air filter
(Org) 81	43 Diaphragm
(QI) Zd	45 Sleeve
Welded ligament panel, Boiler with	
9J3	5 <i>By Motion</i>
Wheel	53 Speed changer
Arrangement of (QI) A to K	55 Crank
base (QI) Y	56 Sandbox
Driving	58 Brake
Diameter (QI) zZ1	5C Acceleration resistor
(Org) F	
Width 9N	6 <i>By Reciprocation</i>
Whistle (Org) 983	61 Piston

63	Tappet	9D	<i>By Protection and safety</i>
65	Pushrod	9D1	Guard
66	Rocker	9D2	Hand rail
		9D5	Light
7	<i>By Rotation</i>	9D6	Spark arrester
71	Camshaft	9D8	Pilot
73	Crankshaft		
75	Rotor	9F	<i>By Attenuation</i>
		9F3	Sound absorber
8	<i>By Inertial mechanism</i>	9F4	Shock absorber
81	Weight	9F5	Vibration absorber
82	Counter weight		
83	Fly wheel	9H	<i>By Lubrication</i>
86	Pendulum	9H3	Lubricator
		9H5	Lubricant
91	<i>By Transfer mechanism</i>		<i>Telescoping point</i>
914	Pump		<i>Earlier level</i>
915	Compressor	Organ	of remove 1
92	Lead (Pipe)	B	Frame
921	Inlet	C	Cab
925	Outlet	C1	Front truck
928	Manifold	D	Tender
92B	Stoker	F	Wheel
92G	Pantograph	F1	Leading wheel
		F3	Driving wheel
93	<i>By Control</i>	F6	Trailing wheel
93A	Governor	G	Engine
93K	Hand wheel	H	Air-in-take equipment
		J	Fuel metering equipment
94	<i>By Heating</i>	K	Electric equipment
943	Feed heater	K1	Generator
945	Fire box	K2	Alternator
		K3	Transformer
95	<i>By Ignition</i>	K5	Switch gear
955	Fuel	K6	Rectifier
956	Spark advance device	K8	Motor
		M	Fuel injection equipment
96	<i>By Cooling and ventilating</i>	Q	Exhaust device
961	Heat exchanger	Q2	Smokeslack
965	Radiator	Q4	Steam exhaust
967	Coolant	V	Starting equipment
968	Ventilator		
97	<i>By Condensation</i>		<i>Earlier level</i>
978	Condenser	a	<i>By Facility</i>
		a2Z	<i>By Visibility</i>
98	<i>By Signalling and indication</i>	a31	Forward
982	Bell	a36	Rearward
983	Whistle		
984	Alarm equipment	a3Z	<i>By Heating and Ventilation</i>
		a44	Heating
9A	<i>By Measurement</i>		<i>Tel (A2) into (A1) begins</i>
9B2	Flow	a45	With boiler van
9B3	Force	a46	Electrical
9B4	Temperature		<i>Tel (A2) into (A1) ends</i>
9B5	Moisture		
9B7	Pressure	a48	Ventilated

a5	By Lighting	r5	Warning system
a55	Compressor assisted	r6	Automatic shut down
a5B	By Voltage	s	By Power
	<i>Note.—Add the given figure to a5B and read it as an integer. (Illustrative)</i>		<i>Tel 3 (A2) into (A1) begins</i>
a5B24	24 Volts	t	Dynamic
	By Track crossing	u	Pneumatic
aB	Cross tracking	u5	Hydraulic
aB1	With retractable wheel	u6	Vacuum
		u8	Air
aZ	By Control	v	Electrical
b	By Emfly regulated	v5	Rheostat
c	By Speed control	v7	Pressurised
	<i>Tel 1 (A2) into (A1) begins</i>	x	Automatic
d	Governor		<i>Tel 3 (A2) into (A1) ends</i>
d1	Direct acting	yA	By Brand
d14	Variable speed		<i>Note.—To be derived by (AD). (Illustrative)</i>
d15	Limited speed	yR	Rolls Royce
d16	Constant speed		By method of starting
d2	Relay type	z02	Manual
d6	Load limiting	z06	Electrical
d8	Load distributing	z061	Battery
e	Mechanical		By Transmission system
f	Hydraulic	zb	By Coupling
j	Pneumatic	zb5	Fluid
	<i>Tel 1 (A2) into (A1) ends</i>	zb6	Torque-converter
k	By Braking system	zb8	Torque-converter coupling
	<i>Tel 2 (A2) into (A1) begins</i>	zd	By Stage
m	By Braking force (% loco weight)	zd1	One
	<i>Note.—Add the given figure to m, and read it as an integer. (Illustrative)</i>	zd2	Two
m73=3	73·3 per cent	zd3	Three
n	By Braking mechanism	zf	By Friction clutch
n1	Internal shoe (Drum)	zf1	Single disc
n5	Disc	zf1Z	Multi-disc
n58	Multi-disc	zf2	Two
nB	Regenerative	zf3	Three
	<i>Tel 1 (A2) into (A1) ends</i>		By Type of transmission
p	By Lubrication	zg	Mechanical
p5	Warning system	zg1	Shaft
p6	Automatic shut down	zg5	Hydromechanical
		zg5S	Suri
q	By Coolant level	zj	Hydraulic
q5	Warning system	zk	Electrical
q6	Automatic shut down		By Mode of operation
r	By Coolant temperature	zm	Manual
		zp	Semi-automatic
		zr	Automatic

	<i>By Number of transmission speed</i>	zH	Direct drive
zz2	Forward		
zz6	Reverse		Tel 4 (A2) into (A1) begins
zz8	Forward and reverse	zJ	Armature on axle
	<i>Note.—Add the given number for speed to the appropriate (IN) for gear, and read it as an integer. (Illustrative)</i>	zK zL zM zN	Quill drive Geared quill drive Linkage Frame-mounting and individual universal rod
zz22	Two forward speeds	zP	Side rod
zz62	Two reverse speeds	zQ	Jack shaft and side rod
		zR	Geared jack shaft
zzA	<i>By Brand of transmission system</i>	zS	Yoke
	<i>Note.—To be derived by (A.D.)</i>		Tel 4 (A2) into (A1) ends
	<i>(Illustrative)</i>	zW	Individual
zzR	Rolls Royce	zX	Collective
	<i>By Gear drive system</i>		
z9a	<i>By Stall torque ratio</i>	zZ1	<i>By Driving wheel diameter</i>
	<i>Note.—Add the first component of the given ratio to z9a, and read it as an integer. (Illustrative)</i>		<i>Note.—Add the given figure in feet and inches to zZ, and read it as an integer. (Illustrative)</i>
z9a5=2	5:2:1	zZ3	3'
		zZA=4	4'4"
		zZA=8=5	4'8.5"
	<i>By Number of the gear</i>		
z9j	General		
z9k	First gear		<i>By Number of axle</i>
z9m	Second gear		<i>Note.—Use the given figure as the (IN), and read it as an integer. (Illustrative)</i>
z9n	Third gear		
z9p	Fourth gear		
z9s	Forward and reverse		
	<i>By Gear reduction ratio</i>	5	5 axles
	<i>Note.—Add the first component of the given ratio to the (IN) for the appropriate number of the gear, if given, otherwise to z9j, and read it as an integer. (Illustrative)</i>	8	8 axles
		12	12 axles
			<i>By Temperature of unit (in °F)</i>
		9b	50 to 59
		9c	60 to 69
		9d	70 to 79
		9e	80 to 89
z9j60	60:1	9f	90 to 99
z9k130	130:1 on first gear	9g	100 to 109
z9n33	33:1 on third gear	9g	
			<i>Note.—Add the digits in the unit place in the figure for the temperature to the appropriate (IN) in the above schedule, and read it as an integer. (Illustrative)</i>
	<i>By Changing of gear</i>		
zA	In stationary position		
zB	In movement		
zC	Self-changing		
	<i>By Gear box mounting</i>		
zE	Axle-mounted	9d5	75° F
		9g1	101° F
	<i>By Kind of drive</i>	9g9	109° F
zG	Single reduction gear		
zG1	Nose suspension		

	<i>By Number of cylinders</i>		<i>resulting figure to</i>
91	One cylinder		99HA or 99HD as the
92	Two cylinders		case may be, and read
93	Three cylinders		it as an integer.
94	Four cylinders		(Illustrative)
98A	Compound engine	99HA33	3300 AC volts
		99HD35	3500 DC volts
	<i>By position of cylinder</i>		
	(for steam loco)		<i>By Mounting or motors</i>
99b	Inside-cylinder	99M1	Axle mounted
99f	Outside-cylinder		
	<i>By Electric/Electronic</i>	99N1	<i>By Number of motors</i>
	<i>equipment</i>	99N2	One
99B	Transformer	99N3	Two
99C	Rectifier		Three
99C1	Silicon	99T	<i>By Revolutions per minute</i>
99C3	Ignitron		<i>Note.—Correct the</i>
	<i>By Motor</i>		<i>given figure to the</i>
99D	<i>By Frequency of supply</i>		<i>nearest hundred, divide</i>
	<i>Note.—Add the given</i>		<i>it by hundred, add the</i>
	<i>figure for the frequency</i>		<i>figure to 99T, and read</i>
	<i>to 99D, and read it as</i>		<i>it as an integer.</i>
	<i>an integer.</i>	99T12	(Illustrative)
	(Illustrative)	99T20	1200 rpm
99D15	15 Cycles		2000 rpm
		99ZA	<i>By Brand</i>
99E	<i>By Phase</i>		
99E1	Single phase		<i>Note.—To be got by</i>
99E2	Two-phase		(AD).
99D3	Three-phase		(Illustrative)
		99ZB	Brush
	<i>By Voltage</i>		
99G	<i>By Motor voltage</i>	9B	<i>By Boiler</i>
99GA	AC	9B1	<i>By Control of temperature</i>
99GD	DC	9B2	Damper bypass
	<i>Note.—Correct the</i>	9B3	Recirculation
	<i>given figure to the</i>	9B5	Differential firing
	<i>nearest hundred, divide</i>	9B52	Attemperation
	<i>it by hundred, add the</i>	9B53	Direct contact
	<i>resulting figure to 99GA</i>	9B54	Drum type
	<i>or 99GC as the case</i>	9B6	Submerged
	<i>may be, and read it as</i>	9BA	Firing rate control
	<i>an integer.</i>	9BB	Manual
	(Illustrative)	9BD	Semiautomatic
99GA6	600 volt		Automatic
99GD15	1500 volt	9C	<i>By Draught</i>
		9C2	Natural
99H	<i>By Supply voltage</i>	9C3	Induced
99HA	AC	9C5	Forced
99HD	DC	9C8	Balanced
	<i>Note.—Correct the</i>		
	<i>given figure to the</i>	9D	<i>By Firing</i>
	<i>nearest hundred, divide</i>	9D1	Stoker
	<i>it by hundred, add the</i>		Chain grate

9D2	Travelling grate		<i>By Size</i>
9D3	Coking grate	9M	<i>By Height (in ft)</i>
9D4	Sprinkler		<i>Note.—Add the given figure to 9M, and read it as an integer.</i>
9D42	Shovel		<i>(Illustrative)</i>
9D45	Rotary		
9D5	Spreader	9M36	36 ft
9D91	Horizontal	9M38=6	38 ft 6 in
9D93	Vertical		
9D94	Opposed		
9D96	Tangential	9N	<i>By Width (in ft)</i>
9DA	Hand firing		<i>Note.—Add the given figure to 9N, and read it as an integer.</i>
9DD	Automatic		<i>(Illustrative)</i>
9E	<i>By Header</i>		
9E3	Box	9Q25	2.5 lb/hr
9E4	Sectional	9Q26=5	26.5 lb/hr
9F	<i>By Tube</i>	9R	<i>By Rate of combustion (in Btu)</i>
9F1	Horizontal		<i>Note.—Correct the given figure to the nearest hundred, divide it by 100, add it to 9R, and read it as an integer.</i>
9F2	Horizontal return		<i>(Illustrative)</i>
9F3	Vertical		
9F5	Inclined		
9F6	Bent		
9H	<i>By Furnace</i>		
9H1	Internal		
9H5	External		
9HB	Scotch	9R28	2800 Btu
9HD	Dutch oven		
9HF	Cyclone		<i>By Fuel</i>
9HG	Turbo	9T	Pulverised coal
9HJ	Combination	9T1	Anthracite
9HM	Hopper bottom	9T2	Semi-anthracite
9HP	Slagtap	9T3	Bituminous coal
		9T4	Sub-bituminous coal
9J	<i>By Construction</i>	9T5	Lignitic
	<i>By Tube positioning</i>	9T6	Brown coal
9J2	Close spaced	9T7	Hard coal
9J3	Welded ligament panel	9T8	Peat
9J4	Flat stud welded to side	9TE	Coke
9J5	Full stud wall		<i>Tel (A3) into (A2) begins</i>
9J6	Tube and tile	9TF	High temperature coke
		9TG	Low temperature coke
9JC	<i>By Refractory wall</i>	9TJ	Fluid coke
9JF	Solid	9TK	Coke breeze
9JF1	Water-cooled		<i>Tel (A3) into (A2) ends</i>
9JF2	Bare plate	9TM	Oil
9JF3	Bare tube		
9JF3	Extended surface		
9JF5	Protected tube	9V	<i>By Temperature (in ° F)</i>
9J1	Air cooled (Hollow)		<i>Note.—Correct the given figure to the tenth place, divide it by 10, add it to 9V, and read it as an integer.</i>
9K1	<i>By Support</i>		<i>(Illustrative)</i>
9K2	Suspended		
9K2	Structural support		
9K23	On brick setting	9V26	260° F
9K26	Independent of brick setting	9V32	320° F

9W	By Thermal efficiency (in percentage) <i>Note.</i> —Add the given figure to 9W, and read it as an integer. (Illustrative)	9C 9C1 9C5 9C7 9C7	By Fuel injection system Direct Metered port injection Continuous port injection Carburetted
9W55	55 per cent	9D	By Stroke distance (in inches) <i>Note.</i> —Add the given figure in inches to 9D and read it as an integer. (Illustrative)
9W62=5	62.5 per cent		
9X	By Design pressure (lb/sq in gauge) <i>Note.</i> —Correct the given figure to the tenth place, divide it by ten, add it to 9X, and read it as an integer. (Illustrative)	9E17=6 9F	17.6 litres By Fuel tank capacity (in gallons) <i>Note.</i> —Correct the given figure to the tenth place, divide it by 10, add the resulting figure to 9F, and read it as an integer. (Illustrative)
9X25	250 lb/sq in g		
9X32	320 lb/sq in g		
9Y	By Capacity <i>Note.</i> —Correct the given figure to the nearest thousand, divide it by 1,000, add it to 9Y and read it as an integer. (Illustrative)	9F35 9G	350 gal By Crankshaft speed <i>Note.</i> —Correct the given figure to the nearest 100, divide it by 100, add the resulting figure to 9G, and read it as an integer. (Illustrative)
9Y55	55000 lb/hr		
9Y63	63000 lb/hr		
	By Method of increasing efficiency		
9Za	Air heater	9G18	1800 rpm
9Zc	Economiser	9G32	3200 rpm
9Zf	Superheater		
9Zh	Reheater	9Hz	By Cylinder arrangement
9Zm	Topping	9H	In line
9Zm5	Supercharging	9H1 9H3 9H4 9HB	Horizontal V-type W-type Double bank
9ZA	By Brand <i>Note.</i> —To be derived by (AD), (Illustrative)	9J	By Bore diameter (in inches) <i>Note.</i> —Add the given figure to 9J, and read it as an integer. (Illustrative)
9ZC	Cochran		
9ZM	Maxecon		
9ZP	Powermaster		
9Az	By Propulsion Unit (For Petrol/Diesel Engine)	9J8 9J10=5	8 in 10.5 in
9B	By Cooling method By Fluid	9K	By Number of cylinders <i>Note.</i> —Add the given figure to 9K, and read it as an integer. (Illustrative)
9B3	Oil		
9B5	Water		
9B8	Air		
9BA	By Device	9K8	8 cylinders
9BF	Radiator	9K16	16 cylinders

9L	<i>By Cycle</i>		<i>By Number of engines</i>
9L2	Two stroke		<i>Note.—Add the given</i>
9L21	Single acting		<i>figure to 9Z, and read</i>
9L22	Double acting		<i>it as an integer.</i>
9L4	Four stroke		<i>(Illustrative)</i>
9M	<i>By Compression ratio</i>	9Z1	Single
	<i>Note.—Add the given</i>	9Z2	Two
	<i>figure to 9M, and read it</i>	9ZA	<i>By Brand of engine</i>
	<i>as an integer.</i>		<i>Note.—To be derived</i>
	<i>(Illustrative)</i>		<i>by (AD).</i>
9N170	170 ft/lb	9ZP	<i>(Illustrative)</i>
		9ZR	Paxman
9P	<i>By Brake horse power</i>		Rolls Royce
	1 to 99 bhp	9A	<i>By Gas turbine</i>
		9B	<i>By Cooling method</i>
	<i>Note.—Add the given</i>	9B2	Effusion
	<i>figure to 9P, and read</i>	9B5	Liquid
	<i>it as an integer.</i>	9B6	Film
	<i>(Illustrative)</i>	9B7	Cycle
9P34	34 bhp	9B8	Air
9Q	100 to 999 bhp	9C	<i>By Number of compressor</i>
	<i>Note.—Correct the</i>		<i>stage</i>
	<i>given figure to the</i>	9C1	Single
	<i>nearest ten, divide it by</i>	9C1Z	Multi-
	<i>10, add the resulting</i>	9C2	Two
	<i>figure to 9Q, and read</i>	9C3	Three
	<i>it as an integer.</i>		
	<i>(Illustrative)</i>	9D	<i>By Compressor type</i>
9Q55	550 bhp	9D1	Centrifugal
9R	1000 bhp and above	9D2	Axial flow
	<i>Note.—Correct the</i>	9D4	Mixed flow
	<i>given figure to the</i>	9E	<i>By Kind of combustion</i>
	<i>nearest hundred, divide</i>		<i>chamber</i>
	<i>it by 100, add the</i>	9E2	Can-type
	<i>resulting figure to 9R,</i>	9E5	Annular
	<i>and read it as an</i>		
	<i>integer.</i>	9F	<i>By Number of combustion</i>
	<i>(Illustrative)</i>		<i>chamber</i>
9R55	5500 bhp		<i>Note.—Add the given</i>
			<i>figure to 9F, and read</i>
			<i>it as an integer.</i>
			<i>(Illustrative)</i>
	<i>By Method of power increase</i>	9F2	2
9S	Supercharged	9F4	4
9S1	With compressor	9H	<i>By Number of turbine stage</i>
9S2	Differential		<i>Note.—Add the given</i>
9S5	Turbo charging		<i>figure to 9H, and read</i>
9SA	Gas turbine assisted	9H2	<i>it as an integer.</i>
	<i>Note.—Correct the</i>	9H3	<i>(Illustrative)</i>
	<i>given figure for the bhp</i>		2-Stage
	<i>of the gas turbine to</i>		3-Stage
	<i>the nearest hundred,</i>		
	<i>divide it by 100, add</i>		
	<i>the resulting figure to</i>		
	<i>9SA, and read it as</i>		
	<i>an integer.</i>		
	<i>(Illustrative)</i>		
9SA10	1000 bhp	9J	<i>By Shaft arrangement</i>

9J1	Single	9ZA	By Brand
9J2	Dual		Note.—To be got by (AD).
9K	By Cycle		(Illustrative)
9K6	Closed	9ZR	Rolls Royce
9K7	Semiclosed		
9K8	Open		By Arrangement of wheels (For Diesel Engine)
9M	By Fuel	A	A1A
9M1	Solid	AA	A1A-A1A
9M11	Coal	B	B
9M12	Coal slurry	BA	B-A1A
9M5	Liquid mixture	BB	B-B
9M52	Gasolene	C	C
9M55	Kerosene	COCO	CO-CO
9M8	Gaseous fuel	CC	C-C
9MB	Single		(For Steam Locomotive)
9MC	Dual		By Pilot wheel
9MJ	Multi	A	0
		B	2
		C	4
		D	6
		E	8
		F	10
		G	12
9N	By Speed (rpm)		By Driving wheel
	Note.—Correct the given figure to the nearest hundred, divide it by hundred, add the figure to 9N, and read it as an integer.		Note.—Use the given figure (Illustrative)
9N70	7000 rpm		2
9N85	8500 rpm	2	4
		4	
9P	By Fuel capacity (in lb)		Note.—To construct the (IN) for wheel arrangement of a steam locomotive, add the given figure(s) for the driving wheels in between the (IN) for the other pairs of pilot wheels, and read it as an integer.
	Note.—Correct the given figure to the nearest thousand, divide it by 1000, add the figure to 9P, and read it as an integer.		(Illustrative)
9P75	7500 lb		
9P82	8200 lb		
9R	By Brake horse power	B6A	2-6-0
	Note.—Correct the given figure to the nearest hundred, divide it by hundred, add the figure to 9R, and read it as an integer.	B10A	2-10-0
	(Illustrative)	C8=8C	4-8-4
9R85	8,500 bhp	K	Total adhesion
9R88	8,800 bhp		
		M	By Tractive effort
			By Starting tractive effort
			Note.—Correct the given figure in lb to the nearest thousand, divide it by 1000, add the resulting figure to M, and read it as an integer
9S	By Method of power increase		(Illustrative)
9S5	Supercharging	M62	62000 lb
	Turbo-fan		

	By Continuous tractive effort, at speed (lb at mph)	W120	120 mph		
P	Less than 1000 lb				<i>Note.</i> —To construct the (IN) for maximum speed in each gear, add to R1, R2, R3 or R4, as the case may be, the (IN) for the Mean Maximum speed. (Illustrative)
	<i>Note 1.</i> —Add the given figure to P, and read it as an integer.				
Q	Above 1000 lb				
	<i>Note 2.</i> —Correct the given figure to the nearest thousand, divide by 1000, add the resulting figure to Q, and read it as an integer.	R1T15	15 mph on first gear		
	<i>Note 3.</i> —The number for the speed is to be constructed by adding the given figure in mph to the digit B (eg B12 for 12 mph). The figure added is to be read as an integer.	R2T35	35 mph on second gear		
	<i>Note 4.</i> —To construct the (IN) for the Continuous tractive effort at a given speed, add the (IN) for speed constructed according to Note 3, to the (IN) constructed according to Notes 1 and 2 above, whichever is appropriate. (Illustrative)	R4V95	95 mph on fourth gear		
		XB	By Maximum radius of negotiable curve (in feet)		<i>Note.</i> —Add the given figure to XB, and read it as an integer. (Illustrative)
		XB125	125 ft.		
		XB250	250 ft.		
		XD	By Length		
		XE	By Width		
		XF	By Height		<i>Note.</i> —(IN) for a specific dimension is to be constructed by adding the given figures in ft. and in to XD, XE, or XF as the case may be and reading it as an integer. (Illustrative)
P625B5=17	625 lb at 5·17 mph				
Q38B12	38,000 lb at 12 mph	XD56=6	56 ft 6 in length		
Q43B12=8	43,000 lb at 12·8 mph	XE6=4	6 ft 4 in width		
		XF15=8	15 ft 8 in height		
R	By Number of the gear				
R1	First gear	XH	By Rail clearance		<i>Note.</i> —Add the given figure in inches to XH, and read it as an integer. (Illustrative)
R2	Second gear				
R3	Third gear				
R4	Fourth gear				
	By Mean maximum speed (in mph)	XH8=5	8·5 in		
T	Slow (1 to 20 mph)	XH9=2	9·2 in		
U	Medium (21 to 40 mph)	XH9=8	9·8 in		
V	High (41 to 100 mph)	Y	By Wheel base		
W	Very high (above 100 mph)	YA	Rigid		
	<i>Note.</i> —Add the given figure to T, U, V or W as the case may be, and read it as an integer. (Illustrative)	YB	Truck		
		YC	Total		<i>Note.</i> —Add the given figure to YA, YB or YC, as the case may be, and read it as an integer. (Illustrative)
T18	18 mph				
U35	35 mph				

YA7=6	7 ft 6 in, rigid wheel base		3	European narrow gauge=3'281"
YB8=5	8 ft 5 in, truck wheel base			
YC27=5	27 ft 5 in, total wheel base	ZzA	By	Mounting of engine
Za	By Axle load			Note.—The (IN) for brand of the mount to be derived by (AD). (Illustrative)
	Note.—Add the given figure in tonnes and cwt to Za, and read it as an integer. (Illustrative)	ZzM		Metalstik
Za14=15	14 tonnes 15 cwt		By	Number of bogies of loco
Za24	24 tonnes	Z1		One
Za31=6	31 tonnes 6 cwt	Z2		Two
		Z3		Three
Zc	By Weight on drivers		By	Articulation
	Note.—Add the given figure in tonnes and cwt to Zc, and read it as an integer. (Illustrative)	Z6		Non-articulated
		Z7		Articulated
Zc25	25 tonnes		By	Cab
Zc28=5	28 tonnes 5 cwt	Z9b	By	position
Zc35=1	35 tonnes 1 cwt	Z9d		End
				Centre
ZdZ	By Weight of locomotive		By	Structure
Ze	Very light (less than 5 tonnes)	Z9g		Integral with loco frame
		Z9j		Independent borne
Zf	Light (5 to 50 tonnes)		By	Number
Zg	Medium heavy (Over 50 tonnes and less than 200 tonnes)	Z91		One
		Z92		Two
Zh	Heavy (Over 200 tonnes)		By	Environment
	Note.—Add the given figure in tonnes and cwt to Ze, Zf, Zg or Zh, as the case may be, and read it as an integer. (Illustrative)	ZA	By	Latitude
		ZC1		Tropical
		ZC8		Polar
		ZD	By	Altitude
Zel=5	1 tonne 5 cwt			Note.—Correct the figure in ft for the height to the nearest thousand divide it by 1000, add the resulting figure after ZD, and read it as an integer. (Illustrative)
Zg165	165 tonnes			10,000 ft
Zh210	210 tonnes			
Zg	By Gauge of track			
	Less than 2 ft			
Zj	2 ft			
Zk	2 ft 6 in	ZD10		
Zl	3 ft			
Zm	3 ft 3.37 in	ZT	By	resistance
Zp	3 ft 6 in	ZTB		Gross
Zr	4 ft 6 in	ZTD		Inherent
Zs	4 ft 8.5 in	ZTG		Incidental
Zt	5 ft 6 in	ZTJ		Curve
	Note 1.—American standard gauge=4'8.5"	ZTM		Grade
	2 American narrow gauge=2'6" to 3'6"	ZTP		Acceleration
			By	Purpose
			By	Entity transported

(c)	Freight(Goods)	(1)	By Country of make
(d)	Passenger		Note.—To be derived
(d)1	Commuter		by (GD).
(f)	Shunting (Switching)		(Illustrative)
(g)	Industrial	(44)	India
(h)	Mixed duty	(56)	Great Britain
(i)		(73)	United States of America
	<i>By Service line</i>		
(m)	Main line	(A)	By Brand
(n)	Branch line		Note.—To be derived
(p)	Underground (Subway)		by (AD).
			(Illustrative)
	<i>By Distance</i>		
(i)	Short	(S)	Swindon
(v)	Long	(U)	Unilok

8 EXAMPLES

D9F4 LOCOMOTIVE PRODUCTION

D9F5 STEAM LOCOMOTIVE

D9F5,(44)-(c)-Zk-B8B;b7213:f STEAM LOCOMOTIVE, INDIAN MAKE, GOODS TRANSPORT, METRE GAUGE, 2-8-2 WHEEL ARRANGEMENT, RIDING STABILITY, INVESTIGATION

- 1 N55 STABILITY IN riding of 'YD' metre gauge locomotives. (Ind rail tech bul. 12;1955;508-10).

D9F5, (44)-(j)-Zk-Zf38=10=8-YB8-XF11=3-M14-B6B;b7211:f STEAM LOCOMOTIVE, INDIAN MAKE, MIXED DUTY, METRE GAUGE, 38 TONNES 10-8 CWT WEIGHT, 8'4" TRUCK WHEEL BASE, 11'3" HEIGHT, 14000 LB STARTING TRACTIVE EFFORT, 0-6-0 WHEEL ARRANGEMENT, LATERAL STABILITY, INVESTIGATION

- 2 N55 LATERAL STABILITY of M G Prototype YL (2-6-2) locomotives. (Ind rail tech bul. 12;1955;510-2).

D9F5,(53)-(m)-(d)-Zs-Zg160-YC32=10-V-M60-C8A-99b-98A-94 STEAM LOCOMOTIVE, FRENCH MAKE, MAIN LINE SERVICE, PASSENGER TRANSPORT, 4'8-5" GAUGE, 160 TONNES WEIGHT, 32'10" TOTAL WHEEL BASE, HIGH SPEED, 60000 LB STARTING TRACTIVE EFFORT, 4-8-0 WHEEL ARRANGEMENT, INSIDE CYLINDER, COMPOUND ENGINE, 4-CYLINDERS

- 3 N64 TUPLIN (W A). Ultimate steam locomotive (Paris-Orleans 4 cylinder compound 4-8-0). (Engineer. 218;1964;330-4).

D9F6 ELECTRIC LOCOMOTIVE

D9F6,(58)-(d)-v5-k;cT1:x3,l ELECTRIC LOCOMOTIVE, RUSSIAN MAKE, PASSENGER TRANSPORT, RHEOSTAT BRAKE, NET WORK

- 4 N65 RAKOV (V A). Passenger electric locomotive with rheostat braking. (Elektr i toplovoz tiaga. 3;1965 Mar;22-6. (Power expr. 4;1965;123)

D9F6,(G)-(56)-(m)-(d)-ZD10-Zk-Za14=15-9k20 ELECTRIC LOCOMOTIVE, GENERAL ELECTRIC, BRITISH MAKE, MAIN LINE SERVICE, PASSENGER TRANSPORT, 10000 FT ALTITUDE, 3' GAUGE, 14 TONNES 15 CWT AXLE LOAD, 2020 HP ENGINE

- 5 N64 3-Ft GAUGE LOCOMOTIVES for Colombia: Ten 2020 hp General Electric units with 14½ ton axle load for main line service upto nearly 10000 ft. (Rail gaz. 120;1964;930-1).

- D9FB PETROL LOCOMOTIVE
 D9FB.) ()-Zs-Ze2-T8-M7-9ZU-9P34-9H3-9G34-9F12-9BB-z9n 33
 z9n62-z9m130-u5-k-aB1 PETROL LOCOMOTIVE, SHUNTING, 4'8"-5"
 GAUGE, 2 TONNES WEIGHT, 8 MPH SPEED, 7000 LB STARTING TRACTIVE
 EFFORT, UNILOK ENGINE, 34 BHP, V-CYLINDER ARRANGEMENT,
 34000 RPM, 12 LITRES DISPLACEMENT, AIR COOLED, 33:1 REDUCTION
 RATIO ON THIRD GEAR, 32:1 REDUCTION RATIO ON SECOND GEAR,
 130:1 REDUCTION RATIO ON FIRST GEAR, HYDRAULIC BRAKE,
 CROSS-TRACKING FACILITY, RETRACTABLE WHEEL
- 6 N65 Cross Track loco: Unique light shunting loco powered by petrol
 engine. (Eng des and appl. 1,15;1965;18-9).
- D9FC DIESEL-ELECTRIC LOCOMOTIVE
 D9FC.9ZK-9S8(10)-9R20-zk-a46 DIESEL-ELECTRIC LOCOMOTIVE,
 LOCOMOTIVE, KLOCKNER-HUMBOLDT-DEUTZ ENGINE, 1000 BHP GAS
 TURBINE ASSISTED, 2000 BHP, ELECTRICAL TRANSMISSION, ELECTRI-
 CAL HEATING FACILITY
- 7 N65 TURBINE ASSISTED diesel loco. (Eng des and appl. 1,10;1965
 July;20).
- D9F6, (53)-(j)-Z2-Zg106-V80=7-AA-9ZS-9R26-9K12-9J8-9H3-
 9G11-9D11-99N2-99G1-zz8-zr-zk-a44 DIESEL-ELECTRIC LOCO-
 MOTIVE, FRENCH MAKE, MIXED DUTY, 2 BOGIES, 106 TONNES
 WEIGHT, 80.7 MPH SPEED, A1A-A1A WHEEL ARRANGEMENT,
 SULZER ENGINE, 2650 BHP, 12 CYLINDERS, 8" BORE DIAMETER, V-
 CYLINDER ARRANGEMENT, 1050 RPM, 11" STROKE DISTANCE, 2
 ELECTRIC MOTORS, AXLE MOUNTED, FORWARD AND REVERSE SPEED,
 AUTOMATIC ELECTRICAL TRANSMISSION, HEATING FACILITY WITH
 BOILER VAN
- 8 N63 FRENCH LOCOMOTIVE activities. (Oil eng and gas turb. 31;1963
 July;26).
- D9FC.(56)-Zs-Zg114-YC51=6-YB14=6-XF12=10-XE8=10-XD
 63=6-V95-Q30B27-M55-COCO-9S8-9R27-9L4-9K12-9J11-
 9HB-9H-9G8-9E266-9D14=4-9B5-99ZB-99T12-zZ3=9-
 zM51-zk DIESEL-ELECTRIC LOCOMOTIVE, BRITISH MAKE, 4'8"-5"
 GAUGE, 114 TONNES WEIGHT, 51'6" TOTAL WHEEL BASE, 14'6" TRUCK
 WHEEL BASE, 12'10" HEIGHT, 8'10" WIDTH, 63'6" LENGTH, 95 MPH
 SPEED, 30,000 LB CONTINUOUS TRACTIVE EFFORT AT 27 MPH,
 55,000 LB STARTING TRACTIVE EFFORT, Co-Co WHEEL ARRANGE-
 MENT, GAS TURBINE ASSISTED DIESEL ENGINE, 2750 BHP, 4 STROKE,
 12 CYLINDERS, 11" BORE, DOUBLE BANK-IN LINE ARRANGEMENT,
 800 RPM, 266 LITRES DISPLACEMENT, 14'4" STROKE DISTANCE,
 WATER COOLED, BRUSH ELECTRIC MOTOR, 12000 RPM GENERATOR
 SPEED, 3'9" DRIVING WHEEL DIAMETER, ELECTRICAL TRANSMISSION
- 9 N64 BRITISH RAILWAYS standard type 4 locomotive. (Oil eng and gas
 turb. 31;1964 Feb;28-9).
- D9FC.(73)-Z91-Zh272-XF16=6-XC83=6-V70-9ZG-9Z2-9R50-
 9K16-9H3-zk-v7--DIESEL ELECTRIC LOCOMOTIVE, AMERICAN
 MAKE, SINGLE CAB, 272 TONNES WEIGHT, 16'6" HEIGHT, 83'6"
 OVERALL LENGTH, 70 MPH SPEED, G E ENGINE, 2 UNITS, 5000
 BHP, 16 CYLINDERS, V-CYLINDER ARRANGEMENT, PRESSURISED
 ELECTRICAL CONTROL
- 10 N63 A 5000 HP American diesel-electric locomotive. (Oil eng and
 gas turb. 31;1963 July;27).

- D9FD DIESEL-HYDRAULIC LOCOMOTIVE
 D9FD, BB-9ZN-9R11-9L4-9K12-9G15-u-m73=84-zj DIESEL-HYDRAULIC LOCOMOTIVE, B-B WHEEL ARRANGEMENT, NBI-MAN DIESEL ENGINE, 1100 BHP, 4 STROKE, 12 CYLINDERS, 1500 RPM-PNEUMATIC BRAKE, 73-84% BRAKING FORCE, HYDRAULIC TRANS, MISSION
- 11 N62 ELL (S O). Recent developments in diesel rail traction. (Dies Eng Users Assoc, 1962 July).
- D9FD,(56)-ZzM-YB30-T18-M20-A4A-9ZR-9S-9Q30-9K8-9G18-9G1-z9E-z9A-zzR-zz8-zj-zf2-zd3-zb6-r3-q6-p6-k DIESEL-HYDRAULIC LOCOMOTIVE, BRITISH MAKE, METALASTIK MOUNTING, 30 TONNES WEIGHT, 18 MPH SPEED, 20160 LB STARTING TRACTIVE EFFORT, 0-4-0 WHEEL ARRANGEMENT, ROLLS ROYCE ENGINE, SUPERCHARGED, 307 BHP, 8 CYLINDERS, 18000 RPM, DIRECT FUEL INJECTION, AXLE-MOUNTED GEAR, GEAR CHANGE IN STATIONARY POSITION, ROLLS ROYCE TRANSMISSION SYSTEM, FORWARD AND REVERSE SPEED, HYDRAULIC TRANSMISSION, TWIN-DISC CLUTCH, 3-STAGE, TORQUE CONVERTER, HIGH COOLANT TEMPERATURE WARNING SYSTEM, AUTOMATIC SHUT DOWN FOR LOW LUBRICATING OIL LEVEL, AUTOMATIC CONTROL OF OVER-SPEED
- 12 N65 ROLLS-ROYCE Powered locomotives for Ceylon. (Eng des and appl. 1,5;1965;20).
- D9FD,(56)-(f)Zd-Zf48-T12=5-M33-9ZR-9S-9Q31-9G18-9K8-9C1-9BF25-9ZE-zzR-zz8-zj-zg1H-zf2-zd3-zb6-u-n1-a5B24 DIESEL-HYDRAULIC LOCOMOTIVE, BRITISH MAKE, SHUNTING, CENTRE CAB, 48 TONNES WEIGHT, 12.5 MPH SPEED, 33000 STARTING TRACTIVE EFFORT, ROLLS ROYCE ENGINE, SUPERCHARGED, 311 BHP, 18000 RPM SPEED, 8 CYLINDERS, DIRECT FUEL INJECTION, SERCK RADIATOR COOLER, AXLE-MOUNTED GEAR BOX, ROLLS ROYCE TRANSMISSION SYSTEM, FORWARD AND REVERSE SPEED, HYDRAULIC TRANSMISSION, HARDY SPICER CARDAN SHAFT TYPE, TWIN-DISC, 3-STAGE, TORQUE CONVERTER, PNEUMATIC DRUM BRAKE, 24-VOLT LIGHTING
- 13 N64 DIESEL HYDRAULIC LOCOS for CEGB. (Oil eng and gas turb. 32; 1964 July;33).
- D9FD,(56)-(g)-Zl-Zf44-YB9=6-XB165-U23=27-M33-A6A-9ZP-9Q40-9K12-9H3-9B8-9G18-zA3=9-zj DIESEL-HYDRAULIC LOCOMOTIVE, BRITISH MAKE, INDUSTRIAL PURPOSE, 5' 6" GAUGE, 44 TONNES WEIGHT, 9' 6" TRUCK WHEEL BASE, 165' RADIUS OF NEGOTIABLE CURVE, 23-27 MPH SPEED, 33210 LB STARTING TRACTIVE EFFORT, 0-6-0 WHEEL ARRANGEMENT, PAXMAN ENGINE, 40 BHP, 12 CYLINDERS, V-CYLINDER ARRANGEMENT, 1800 RPM. AIR-COOLED, 3' 9" DRIVING WHEEL DIAMETER, HYDRAULIC TRANSMISSION
- 14 N63 SERVING the National Coal Board. (Oil eng and gas turb. 31; 358;1963;33).
- D9FD,(56)-(g)-(f)-Zk-Zf2b-YA5=9-XF10=10-XE3-XD14=2-U25-A4A-9ZR-U-9Q20-9G18-zZ3=5-z9E-z9j16=113-zj-zf2-u8W DIESEL-HYDRAULIC LOCOMOTIVE, BRITISH MAKE, INDUSTRIAL PURPOSE, SHUNTING, 3' GAUGE, 26 TONNES WEIGHT, 5' 9" RIGID WHEEL BASE, 10'10" HEIGHT, 3' WIDTH, 14'2" LENGTH OVER BUFFER, 25 MPH SPEED, 0-4-0 WHEEL ARRANGEMENT, RUSTON ENGINE, 200 BHP, 1800 RPM, 3'5" DRIVING WHEEL DIAMETER, AXLE-MOUNTED GEAR, 16-113:1 GEAR REDUCTION RATIO, HYDRAULIC TRANSMISSION, TWIN-DISC CLUTCH, WESTINGHOUSE AIR-BRAKE

- 15 N64 INDUSTRIAL SHUNTING locomotive. (Oil eng and gas turb. 32; 1964 May; 30).

D9FD. (563)-(f)-ZzM-Zl-YB7-XF12 = 4-XE9 = 3-KD40-U20-Q34B3 - BB-9ZR-9Z1-9S-9Q31-9K8-9J5 = 125-9G18-9F20-9E12 = 17-9D6-9C1-zZ3 = 7-zzR-zg5-zf2-zd3-zb8 DIESEL HYDRAULIC LOCOMOTIVE, SCOTISH MAKE, SHUNTING, METALASTIK MOUNTING, 5' 6" GAUGE, 20 MPH SPEED, 7' TRUCK WHEEL BASE, 12' 4" HEIGHT, 9' 3" WIDTH, 40' LENGTH 3400 LB CONTINUOUS TRACTIVE EFFORT AT 3 MPH, B-B WHEEL ARRANGEMENT ROLLS ROYCE ENGINE, 2-UNITS, SUPERCHARGED, 311 BHP, 8-CYLINDER, 5-125" BORE, 1800 RPM, 200 GALLONS FUEL TANK CAPACITY, 12-17 LITRES DISPLACEMENT, 6" STROKE, DIRECT FUEL INJECTION, 3' 7" DRIVING WHEEL DIAMETER, ROLLS ROYCE TRANSMISSION HYDROMECHANICAL TRANSMISSION, TWIN-DISC CLUTCH, 3-STAGE, SYSTEM, TORQUE CONVERTER COUPLING.

- 16 N63 SCOTTISH-BUILT SHUNTING locomotives for Colombo. (Oil eng and gas turb. 31,356;1963;36-7).

D9FD. (S)-(f)-Zs-ZI37-YA6-XH8-XF10 = 10 = 105-XE8 = 6-SD21 = 5-XC24 = 6 = 75-T17-M23-A4A-9ZR-9Q25-9K8-9J5 = 125-9G18-9F35-9E16 = 25-9D6-z9C-z9a5 = 2-zzR-zz8-zj-zf2-zb8 DIESEL-HYDRAULIC LOCOMOTIVE, SENTINEL, SHUNTING, 4' 8-5" GAUGE, 37 TONNES WEIGHT, 6' RIGID WHEEL BASE, 8" RAIL CLEARANCE, 10' 10-5" HEIGHT, 8' 6" WIDTH, 21' 5" LENGTH 24' 6-75" OVERALL LENGTH, 17 MPH SPEED, 23170 LB STARTING TRACTIVE EFFORT, 0-4-0 WHEEL ARRANGEMENT, ROLLS ROYCE ENGINE, 250 BHP, 8 CYLINDERS, 5-152" BORE DIAMETER, 1800 RPM, 350-GALLONS FUEL TANK CAPACITY, 16-25 LITRES DISPLACEMENT, 6" STROKE DISTANCE, SELF-CHANGING GEAR, 5-21:1 STALL TORQUE RATIO, ROLLS ROYCE TRANSMISSION SYSTEM, FORWARD AND REVERSE SPEED, HYDRAULIC TRANSMISSION, TWIN-DISC CLUTCH, TORQUE CONVERTER COUPLING.

- 17 N63 CONVERSION OF ironworks shunter fleet. (Oil eng and gas turb. 31;1963 Sep;33).

D9FD.(SI)-(g)-Zh-Zel = 25-XF3 = 11-XE2 = 11-XD5 = 3-P625B5 = 17-9ZL-9P10-9G20-9B8-zz81-zj-z061-n1 DIESEL-HYDRAULIC LOCOMOTIVE, SIMPLEX, INDUSTRIAL PURPOSE, 2' GAUGE, 1 TONNE 25 CWT WEIGHT, 3' 11" HEIGHT, 2' 11" WIDTH, 5' 3" LENGTH ER, 625 LB STARTING TRACTIVE EFFORT AT 5-17 MPH, LISTER ENGINE, 10 BHP, 2000 RPM, AIR-COOLED, ONE FORWARD AND REVERSE SPEED, HYDRAULIC TRANSMISSION, BATTERY STARTING, INTERNAL SHOE BRAKE.

- 18 N63 NEW SIMPLEX locomotive. (Oil and gas turb. 31;1963 July;27).

D9FD. (SW)-Z9d-ZzM-Zs-Zg51-YG15 = 6-XE8 = 25-XC34 = 6-U40-Q27B5 = 6-M31-A6A-9ZV-9Q65-9K6-9J7 = 5-9H3-9G15-9F34-9D8 = 5-9BF25-zZ4-zj|H-f-a55W DIESEL-HYDRAULIC LOCOMOTIVE, SWINDON, CENTRE CAB, METALASLIK MOUNTING, 4' 8-5" GAUGE, 51 TONNES 15 CWT WEIGHT, 15' 6" TOTAL WHEEL BASE, 8' 2-25" WIDTH, 34' 6" OVERALL LENGTH, 40 MPH SPEED, 27000 LB CONTINUOUS TRACTIVE EFFORT AT 5-6 MPH, 31000 STARTING TRACTIVE EFFORT, 0-6-0 WHEEL ARRANGEMENT, VENTURA ENGINE, 650 BHP, 6 CYLINDERS, 7-5" BORE V-CYLINDER ARRANGEMENT, 1500 RPM SPEED, 340 GALLONS FUEL TANK CAPACITY, 8' 5" STROKE DISTANCE, SERCK RADIATOR COOLER, 4' DRIVING WHEEL

- DIAMETER, HARDY SPICER CARDAN SHAFT HYDRAULIC TRANSMISSION, HYDRAULIC GOVERNOR, WESTINGHOUSE COMPRESSOR ASSISTED LIGHTING
- 19 N64 SWINDON-BUILD PAXMAN-POWERED type 1 loco. (Oil eng and gas turb. 32;1964 Sep:31-2).

D9FD, (T)-(54)-Zf-W120-224-9ZM-9Z2-9S5-9R12-9K12-9G15-9BF3B-9B-zzM-zz22-zg5-a56 DIESEL-HYDRAULIC LOCOMOTIVE, TALGO, SPANISH MAKE, 120 TO 224 MPH SPEED, MAYBACK ENGINE, 2 UNITS, TURBOCHARGED, 12000 BHP, 12 CYLINDERS, 1500 RPM, BEHR V-FORM RADIATOR COOLER, GEAR CHANGE IN MOTION, MEKHYDRO TRANSMISSION, TWO FORWARD AND TWO REVERSE SPEEDS, HYDROMECHANICAL TRANSMISSION, COLD START PREVENTED BY ELECTRICAL HEATING

- 20 N65 MORE TALGO trains. (gas and oil pow, 61; 1965; 80).

D9FF STEAM TURBINE LOCOMOTIVE

D9FF,(73)-(d)-Zs-Zh259-YC53-YB19 = 6-YA13=6-M71-9P85-zZA5 = 8-z9J18 = 5-zk STEAM TURBINE LOCOMOTIVE, AMERICAN MAKE, PASSENGER TRANSPORT, 488' 5" GAUGE, 259 TONNES WEIGHT, 53' TOTAL WHEEL BASE, 19' 6" TRUCK WHEEL BASE, 13' 6" RIGID WHEEL BASE, 71000LB STARTING TRACTIVE EFFORT, 35000LB FUEL CAPACITY, 5' 8" DRIVING WHEEL DIAMETER, 18.5:1 gear reduction ratio, ELECTRICAL TRANSMISSION

- 21 N45 AMERICAN GEARED turbine steam locomotive. (Engineer. 180; 1945; 466-9).

D9FF,(73)-(d)-Z2-Zh23n-YA13=4-XF15-XE10=8=75-XC90=10-V95-zZA3=8-zk-v STEAM TURBINE LOCOMOTIVE, AMERICAN MAKE, PASSENGER TRANSPORT, 2 BOGIES, 236 TONNES WEIGHT, 13' 4" RIGID WHEEL BASE, 15' HEIGHT, 10' 8-75" WIDTH, 90' 10" OVERALL LENGTH, 95 MPH SPEED, 3' 8" DRIVING WHEEL DIAMETER. ELECTRICAL TRANSMISSION, AUTOMATIC CONTROL

- 22 N39 AMERICAN TURBO-ELECTRIC locomotive. (Engineer. 167; 1939; 286-8).

D9FJ GAS TURBINE LOCOMOTIVE

D9FJ, (B)-(d)-Z92-Z2-Zs-Zg115-XF13 = 4-XC63-V90-Q32B21-M12B64-AA-9R25-4-zZ4-zk-x-u8-b1 GAS TURBINE LOCOMOTIVE, BROWN-BOVERI, PASSENGER TRANSPORT, 2 END CABS, TWO BOGIES, 4' 8-5" GAUGE, 115 TONNES WEIGHT, 13' 4" HEIGHT, 63' OVERALL LENGTH, 90 MPH SPEED, 3200 LB STARTING TRACTIVE EFFORT 21 MPH, 12000 LB CONTINUOUS TRACTIVE EFFORT AT 64 MPH, A1A-A1A, 25000 HP GAS TURBINE, 4 DRIVING AXLES, 4' 1/4" DIAMETER DRIVING WHEEL, ELECTRICAL TRANSMISSION, AUTOMATIC CONTROL, AIR-BRAKE SYSTEM

- 23 N50 BRITISH RAILWAYS gas turbine locomotive No 18 000-1 (Engineer. 189;1950;608-10).

D9FJ,(M)-(j)-Z92-Z9b-Z2-Zg120-YC53-XF12=10-XE9-XD66=8-V90-Q29-M60-9R150-9N70-99M1-6-zk GAS TURBINE LOCOMOTIVE, METROPOLITAN-VICKERS, MIXED DUTY, 2 END CABS, TWO BOGIES, 120 TONNES WEIGHT, 53' TOTAL WHEEL BASE, 12' 10" HEIGHT, 9' WIDTH, 66' 8" LENGTH, 90 MPH SPEED, 29,000 LB CONTINUOUS TRACTIVE EFFORT, 60,000 LB STARTING TRACTIVE EFFORT, 35,000 HP GAS TURBINE, 7000 RPM, AXLE-MOUNTED MOTORS, 6 DRIVING AXLES ELECTRICAL TRANSMISSION

- 24 N49 GAS TURBINE locomotives for British railways: Metropolitan-Vickers gas turbine locomotive. (Engineer. 187; 1949;25-6).

81 FEATURE HEADINGS

811 In the examples in Sec 8, the Feature Headings are rendered according to the method adopted in the depth schedule for Medical Radiology [20]—that is, all the terms for each of the sought upper links are given in the Feature Heading for the last link. It is felt that the reader will find such a Feature Heading more helpful [5].

812 As each subject is analysed in depth, there will be a link for each of the concepts dealt with. It will be noted that in the example the average number of terms in the last link of the Feature Headings is 20.

813 The reader gets a fairly complete idea about the contents of each document even as he looks through the Feature Headings. This facilitates in pinpointedly choosing the documents which he would like to peruse.

814 This obviously will have an influence on the preparation and presentation of abstracts, and their relation to classification of subjects.

815 These questions are being examined and will be reported upon in due course.

BIBLIOGRAPHICAL REFERENCES

- 1 Sec 241 CHAMBER'S TECHNICAL dictionary. Ed 3. 1961.
- 2 Sec 242 *ibid.*
- 3 Sec 243 *ibid.*
- 4 Sec 6 GOPINATH (M A), NEELAMEGHAN (A), RANGANATHAN (S R), and SEETHARAMA (S). Connecting symbol for alphabetical device for multinomials. (Herald lib sc. 4; 1965; Paper ZZA).
- 5 Sec 811 GUNDU RAO (D). Style and rendering of feature heading etc. (Indian Standards Convention (9). Papers for session S8: Documentation and library housing. 1965. Paper A:4).
- 6 Sec 23 MCGRAW-HILL ENCYCLOPEDIA of science and technology. 1960. V4; P 603.
- 7 Sec 24 *ibid.* (V 7; P 570).
- 8 Sec 244 *ibid.* (V 7; P 572).
- 9 Sec 245 *ibid.* (V 7; P 572).
- 10 Sec 21 *ibid.* (V 8; P 3).
- 11 Sec 22 *ibid.* (V 8; P 5).
- 12 Sec 1 NEELAMEGHAN (A) and GOPINATH (M A). Production engineering of boiler: Depth classification (Annual seminar, Documentation Research and Training Centre. 3; 1965; Paper L).

- 13 Sec 42 NEELAMEGHAN (A) and GOPINATH (A M). Productive methods in the design of a scheme for depth classification: A case study. (Annual seminar, Documentation Research and Training Centre. 3; 1965; Sec C6).
- 14 Sec 43 *ibid.* (Sec C72).
- 15 Sec 51 — and —. Zero increases hospitality. (Annual Seminar, Documentation Research and Training Centre, 3; 1965; Paper D).
- 16 Sec 814 RANGANATHAN (S R). Classified catalogue code. Ed. 5. 1964. Chap UB.
- 17 Sec 17 —. Design of depth classification: Methodology. (Lib sc. 1; 1964; Paper A).
- 18 Sec 33 —. Prolegomena to library classification. Ed 2. 1957. Sec 1432.
- 19 Sec 33 *ibid.* (Sec 261).
- 20 Sec 811 RANGANATHAN (S R), NEELAMEGHAN (A), and GOPINATH (M A). Medical radiology: Depth classification. (Lib sc. 2; 1965; Sec G82).
- 21 Sec 51 —, —, and —. Production engineering of reciprocating internal combustion engine: Depth classification. (Annual seminar, Documentation Research and Training Centre. .2; 1964; Paper 1-3, Sec 53).
- 22 Sec 1 —, —, and —. Production engineering of reciprocating internal combustion engine: Depth classification. (Lib sc. 2; 1965; Paper B).
- 23 Sec 51 *ibid.* (Sec B531).
- 24 Sec 24 WEBSTER'S NEW international dictionary of the English language. Ed 2. 1954.
- 25 Sec 24 WORLD BOOK encyclopedia. 1962. V 11; P 370.