

20 Railroad operation

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- 20a** Different types of railroads, including their drive, except 20b – 20l; permanent way when adapted to the drive structure
 - 20b** Locomotives and driving wagons; sanding devices for rail vehicles
 - 20b** Self-propelled railroad vehicles, locomotives and motor cars, general arrangement and drive
 - 20c** Railroad vehicle superstructures, including interior fittings
 - 20d** Frames, wheel sets, axles and wheels, including adjustable axles, journal boxes, axle lubrication, springs; safety devices for railroad vehicles
 - 20e** Couplings, draft and buffer mechanisms for railroad vehicles
 - 20f** Brakes, mounted on railroad vehicles, also electrically driven air brakes
 - 20g** Turntables, transfer tables, water cranes, bumping posts, track transfer vehicles, freight and passenger transfer devices
 - 20h** Auxiliary apparatus for operation of railroads and streetcars
 - 20i** Interlockings, switch drives, railroad gates, signals, station indicators and train safety devices of all kinds
 - 20k** Current supply for electric railroads
 - 20l** Electric-railroad rolling stock, including devices and processes for their operation, mixed electric traction, current collectors, motors and their control safety devices, electric brakes
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20a Different types of railroads: atmospheric, pneumatic, balloon railways, sledways, moving platforms, rack-and-pinion railroads, elevated railways, suspension railroads, aerial cableways, streetcars, industrial and mine railways, subways (electric subways 20k-1; warehouse service railways 81e), including their drive, except 20b – 20l; permanent way when adapted to the drive structure (general 19a, 19e)

20a-1 Stations and platforms, general arrangement (19a-25, 19a-23/00, 19a-25/00; 19c-1/00; 19e-5), yards, classification yards, humps

Different kinds of railroads and trains

- 20a-2 Atmospheric railways
- 20a-3 Pneumatic railways
- 20a-4 Balloon railways
- 20a-5 Sledways
- 20a-6 Moving platforms
- 20a-7 Rack-and-pinion railroads; general (drive or electrical equipment, 20b-3; 20k; 20l-30)
- 20a-8 Monorail elevated railways (20k; 20l-30)
- 20a-9 Multirail elevated railways
- 20a-10 Monorail ground railways

- 20a-11 Suspension railroads with rigid track and driving engine incorporated in the vehicle (cable tensioners 19a-23/01, 19a-25/01; tracks 19a-23/01, 19a-25/00)
- 20a-12 Aerial cableways, safety bridges preventing the fall of cars (driving pulleys 35a-10; 47b-20; cable pulley drives in general 47h-10; compensating gear 47h-7; cable joints 47d-12; carrying cables 19a-23/01, 19a-25/18; lifting devices for suspension railroads 35b-1; wire cables 73-5/02; auxiliary cableways 81e-119)
- 20a-13 Cable streetcars
- 20a-14 Industrial railroads and pushers, general (of hoist cars 35a-9/12; of tilting cars 81e-95; at loading points 81e-108); also inclined hoists with pneumatic cars (vertical haulage 35a-10, 61a-6); catching devices for mine cars detached from their supporting cable or chain
- 20a-15 Subways (electric 20k-1; 20l-30)
- 20a-16 Inclined railroads including aerial cableways to facilitate mountain ascent, skilifts
- 20a-17 Miscellaneous unusual railways
- Traction cable grabs**
- 20a-18 Cable grabs for suspension cableways (47d-12)
- 20a-19 Cable grabs for cable streetcars
- 20a-20 Cable grabs for industrial railways
- 20b Locomotives and driving wagons** (steam boilers 13; combustion apparatus 24; steam engines 14; condensers etc. 14g, 17d; signalling 74d; electric propulsion 20l); **sanding devices for rail vehicles**
- 20b-1 Steam locomotives, general arrangement
- 20b-2 Steam locomotives for tramways, general arrangement
- 20b-3 Steam locomotives for rack-and-pinion tracks
- 20b-4 Steam accumulator locomotives
- 20b-5/01 Internal-combustion locomotives, general arrangement (46d-9)
- 20b-5/02 with hydraulic transmissions (hydraulic transmissions in general 47h-18; for automobiles 63c-34)
- 20b-5/03 with mechanical transmissions (in general 47h-12 – 47h-17, 47h-19; for automobiles 63c-8 – 63c-12)
- 20b-6 Compressed-air accumulator locomotives, charging devices therefor, hot air locomotives
- 20b-7 Locomotives with several power sources: steam, electricity, gas, air, etc., mechanical part (electrical part 20l-7)
- 20b-8 Locomotives with special propulsion means
- 20b-9 Locomotives for towing ships, barges, etc.
- 20b-10 Driving devices for locomotives powered by engines with reciprocating pistons, general arrangement
- 20b-11 Driving devices for locomotives powered by rotating engines
- 20b-12 Special driving devices for locomotives
- 20b-13 Tenders and devices for water replenishing while underway (20g-9)
- 20b-14 Details of locomotives, insofar as they affect the construction of the locomotive: condensers, ash boxes, exhaust gas removal at the rear end of the train, fans, regulators, seats, platforms, mounting of boilers, drivers' cabins, dust-proofing of driving gear (blast pipes 24i-4; preheaters 13b-9; pressure equalisers 14g-15; charging devices 81e-110)
- Devices for increasing the traction power of locomotives
- 20b-15/01 by magnets, etc.
- 20b-15/02 by auxiliary steam engines, pre-compressors
- 20b-16 Sanding devices operated by air, steam, electricity, etc.
- 20b-17 Manually operated sanding devices
- 20b-18 Miscellaneous devices for locomotives and driving wagons

- 20b Self-propelled railroad vehicles, locomotives and motor cars, general arrangement and drive** (steam generators with accessories 13; steam engines, distributing gear, regulators 14; frames, running gear, trucks 20d; electrical part of the system 20l; fire box with accessories 24; internal-combustion engines 46; lubricating devices 47e)
- Devices for maintaining or increasing the traction or brake power**
- 20b-1 Steam and steam-electric locomotives with steam generation, general arrangement of the power plant (driving gear 20b-10 – 20b-12; electrical section 20l)
- 20b-2 Self-propelled electric vehicles, general arrangement (electrical part 20l)
- 20b-3 Rack-and-pinion self-propelled vehicles and driving gear (20b-10 – 20b-12, electrical section 20l-30/04)
- 20b-4 Steam- accumulator self-propelled vehicles charging and feeding devices (14h-3/01 – 14h-3/06)
- Internal-combustion self-propelled vehicles (20b-7)
- 20b-5/01 Internal-combustion self-propelled vehicles with variable transmission, also with electrical transmission (20l-7/01, 20l-7/02), excluding pneumatic transmission (20b-5/05), general arrangement of the power plant
- Variable transmissions for internal-combustion self-propelled vehicles, excluding pneumatic (20b-5/05) and electric transmissions (20l-7)
- 20b-5/02 Hydraulic transmissions (general 47h-13; for motor (land) vehicles 63c-34/01)
- 20b-5/03 Mating mechanical transmissions, e.g. gearshifts or reversing gears (general 47h-12 – 47h-17; for motor (land) vehicles 63c, 8-12)
- 20b-5/04 Positive mechanical transmissions, e.g. friction gears
- 20b-5/05 Internal-combustion self-propelled vehicle with pneumatic transmissions (driving gear 20b, 10-12; motor (land) vehicles 63c-8 – 63c-12)
- 20b-5/10 Internal-combustion self-propelled vehicles with constant transmission, i. e. direct drive, with or without intermediate gearing (driving gear 20b-10 – 20b-12)
- 20b-6 Compressed-air accumulator self-propelled vehicles, charging devices
- 20b-7 Self-propelled vehicles with multiple drive or with several different power sources (multi-power vehicles), e.g. with internal-combustion drive with constant transmission and with internal-combustion drive with variable transmission or with steam drive (20b-5; 20b-15/02; driving gear 20b-10 – 20b-12; drives with pure electrical and mixed electrical drives 20l-7)
- 20b-8 Self-propelled vehicles with unusual sources of power or with means of locomotion other than usual rail-driving wheels or rack-rail driving wheels, e.g. with propeller (electrical section 20l-30/06)
- 20b-9 Towing vehicles (electrical section 20l-30/05)
- Driving gears, arrangement of group and single drives for steam, internal-combustion** (variable transmissions 20b-5/02 – 20b-5/04) **and electrical self-propelled vehicles** (drives with electrical transmission and mixed electric drive 20l-7) **including the arrangement of lubricating devices** (structure, general 47e), **structure of driving gears between driving shaft and driving wheel** (driving engines 14, 46, 20l, 21)
- 20b-10/01 Crank gears (14a-1), crank gear components (14a-16; general 47b, 47f), apart from 20b-10/40, e.g. main and side rods and rod ends
- 20b-10/10 Wheels and other driving gear (20b-10/40, 20b-12)
- 20b-10/20 Combined crank and wheel driving gears
- 20b-10/40 Driving gear components apart from 20b-10/01, e.g. flexible couplings (general 47c, 20b-12)
- 20b-10/60 Bearings, suspensions, driving gear casings, especially of the driving engine, torque arm suspensions

- 20b-11 Turbine group and single turbine drives (14c-16; 20b-15/02; 46f)
 20b-12 Single drives apart from 20b-11 (20b-10/40, 20b-15/02)
- Arrangement of components of the power plant in rail vehicles
- 20b-14/01 Fuel tanks, tenders, fuel supply while underway (20g-9)
 20b-14/10 Furnaces (24) and accessories (e.g. blast pipes 24i)
 20b-14/20 Boilers (13), preheaters (13b; 24g; 24k), etc.
 20b-14/30 Steam engine valve gears and controls (13d; 14; 20b-18)
 20b-14/40 Condensers (14g-12; 17d)
 20b-14/50 Cooling systems, e.g. for internal-combustion self-propelled cars (46c4)
 20b-14/60 Exhaust gas removal (24g; 46c6), engine space ventilation (20c-25; 63c-74), also streamline design
- 20b-14/70 Crew positions
 20b-14/80 Other equipment, pipes, holders, central lubricating devices (structure, general 47e), etc.
- Devices for maintaining or increasing traction and brake power, and devices to prevent slipping or skidding of the wheels (antiskid devices used during braking 20f-49) through control of wheel pressure
- 20b-15/01 by wheel pressure equalisation, by means of magnets (rail brake magnets 20f-44)
 20b-15/02 by addition of supplementary driving wheels (20b-7, 20b-11, 20b-12; 20l-7/10)
 20b-15/10 through control of the drive, especially of the driving agent, antiskid devices (in electric self-propelled vehicles by purely electrical means 20l-1)
 20b-15/20 by control of the wheel adhesion (rail wetters 20h-10)
- 20b-16 Sanding devices operated by pressure gas, e.g. air or steam sand conveying agent (brake controlled 20f-5)
- 20b-17 Sanding devices apart from 20b-16, especially with gravity sand delivery
 20b-18 Special devices in self-propelled vehicles, e.g. energy accumulation, remote control of any self-propelled vehicles, when not classified in the preceding groups or in their appropriate special arts, e.g. in class 14 and 20l.

20c Railroad vehicle superstructures, including interior fittings

Passenger and freight car bodies without underframes (underframes 20d-1)

- 20c-1 Car bodies for passenger cars (for street vehicles 63a-1, 63c-43/01, 63c-43/04)
 20c-1/01 Car bodies for passenger cars (for street vehicles 63a-1, 63c-43/01, 63c-43/04)
 20c-1/10 Self-supporting car bodies; underframes therefor, which only serve as supports for the longitudinal trusses
- 20c-2 Freight car bodies of wood, or wood and steel (63a-1; 63c-43/07)
 20c-3 Steel freight cars
 20c-4/01 Baggage cars
 20c-4/02 Container cars
 20c-5 Mail cars
 20c-6 Streetcars
 20c-7 Cars for transporting corpses
 20c-8 Cars whose components can be used for tent and bridge erection, crane cars and miscellaneous auxiliary cars (63a-32)
- 20c-9 Tank cars (63a-37), cars for liquid or powder-like freight (24l-3; 81e-60)
 20c-10 Cars for foodstuffs, fruit, granular freight, etc. (17c-5; 63a-36, 63a-37; 45h-25; 45h-63/00; 65a1-2)
 20c-11 Cattle cars (63a-36)
 20c-12 Swing bolster and stake cars (63a-1)

Dump cars and tilting cars for railroads

- 20c-13 Dump cars with slide and hinge closures, hopper cars, mine cars

- 20c-15 Tilting cars (63a-34; 63c-39; mobile tilting devices for cars and containers 81e-97)
20c-16 Trough side dump cars

Safety cars

- 20c-17 Buffer cars, forward cars and other cars for protection in train collisions, also buffers for this purpose; prevention of telescoping and lateral displacement of cars in collisions
20c-18 Cars for protection against train holdups and robberies

Handcars and bicycle cars

- 20c-19 Handcars (devices for removal from the track 20h-6)
20c-20 Bicycles for one or two rails (63h-11)

Heating and cooling, ventilation and lighting of railroad vehicles

- 20c-21 Car heating by means of heating devices, e.g. foot-warmers, stoves
20c-22 Train heating, e.g. water, steam and air heating systems (36c), inclusive of the hose connections (general 47f-6 – 47f-14)
20c-24 Cooling devices (17c-5; 63a-37)
20c-25 Ventilation devices (36d; 63c-74)
20c-26 Dust and wind protectors, general
20c-27 Lighting by means of gas (4c; electric lighting 21f)
20c-29 Windshields for locomotive engineers and streetcar drivers (63a-3; 63c-58)

Components of railroad vehicles

- 20c-30 Car roofs and covers, canvas roofs and tarpaulins (8l-3; 63a-3; 63c-45)
20c-31 Platform and vestibule plates
20c-32 Side grilles for open streetcars, and platform gates
20c-33 Doors for passenger cars and anti-jamming devices (37d-18 – 37d-24; 63a-6; 63c-44; 65a2-35; 68a-91 – 68a-94; 68b; 68c; 68d)
20c-34 Freight car doors and door locks (68a-91 – 68a-94; 68b; 68c; 68d)
20c-35 Devices for simultaneously opening and closing doors (63c-44; 68a-40; 68b; 68c; 68d; 20l-27)
20c-36 Emergency doors
20c-37 Stairs and steps (63a-8)
20c-38 Emergency and auxiliary ramps, connected to cars (81e-121)
20c-39 Windows and curtains with devices for keeping windows clear (34c-3; 34e; 37d-16; 63a-7; 63c-44; 68b-27; 68c-2; 68c-3; 68c-10; 68d)

Furniture as structural parts of the car body of railroad vehicles (if carried along by travellers 34f, 34g, 34i, 34k; 33d)

- 20c-40 Sleeping and dining equipment (33d-5; 33d-6)
20c-41 Seats (33d-5; 33d-6; 34g-7; 63a-2; 63c-46)
20c-42 Sanitary equipment, e.g. washstands, spittoons, toilets, ashtrays (34f-10; 34k-1; 34k-6; 44b-27)
20c-43 Collapsible tables (34i-5/01), writing desks, etc. (34i-8/01)
20c-44 Baggage nets and umbrella holders
20c-45 Arm and head rests for passengers (33d-6)
20c-46 Hand grips and supports for standing passengers

Accessories of railroad vehicles

- 20c-47 Tag and ticket holders
20c-48 Cash collection devices
20c-49 Observation mirrors and signalling devices between passenger and personnel (20i-25 – 20i-27)
20c-50 Devices which make use of the oscillations of moving rail cars

20d **Frames, wheel sets, axles and wheels, including adjustable axles, journal boxes, axle lubrication, springs; safety devices for railroad vehicles**

Underframes and trucks for cars and locomotives, also of elevated and suspension railroads (underframe supports as longitudinal bracing for lower trusses of self-supporting car bodies, see 20c-1/10)

- 20d-1/01 Rigid underframes
- 20d-1/02 All-cast or welded underframes
- 20d-1/10 Underframes for streetcars
- 20d-1/20 Underframes for industrial cars
- 20d-2 Arrangement of the trucks and wheel sets on the vehicle
- 20d-3/01 Truck structures for cars and locomotives
- 20d-3/02 Details of the truck frame and bolster arrangement
- 20d-3/03 Details of the truck centre plates and side bearings
- 20d-4 Underframes and trucks for articulated cars (20c-1)
- 20d-5 Underframes and trucks, the structure of which is modified by the engine mounting (electric motor mounting 20l-21; underframes for excavators 84d-2)

Railroad car radial axles, adjustable locomotive axles, and the like

- 20d-6 Radial axles for cars and locomotives
- 20d-7 Adjustable locomotive axles

Axles and wheel sets

- 20d-8/01 Axles and wheel sets in general, also for industrial cars
- 20d-8/02 Wheel sets for industrial cars with continuous wheel-to-wheel casings designed as grease containers (20d-18)
- 20d-9 Wheel sets with one or two loose wheels
- 20d-10 Wheel sets with divided axles, or jacket and core axles
- 20d-11 Single wheels with short stub axles

Axle bearings and journal boxes

- 20d-12 Axle bearings suitable only for locomotives
- 20d-13/01 Journal boxes including bearings and shock absorber bearings (bearing metals 40b; casting of bearing bushings 31c)
- 20d-13/02 Journal box guides and pedestals
- 20d-13/03 Cooling of journal boxes and safety devices against running hot (20d-18)
- 20d-14 Journal boxes for special purposes, especially for radial axles
- 20d-15/01 Roller and ball bearings, thrust and radial: special structures for railroad vehicles (47b-12; 63d-20; 63d-21)
- 20d-15/02 Roller bearings with safety slide bearings
- 20d-16 Journal box casings and covers
- 20d-17 Dust guards and oil seals for axle bearings of railroad vehicles (47f-22 – 47f-26)

Journal box lubrication

- 20d-18/01 Journal box lubricators in the axle box (lubricating pad cleaning 8a-5; 47e-1; 47e-22 – 47e-26)
- 20d-18/02 Solid grease lubrication (20d-8/02; 20d-20)
- 20d-19 Journal box lubrication with devices external to the axle box for supplying the lubricant (47e-27 – 47e-29; 20h-10)
- 20d-20 Lubricating devices built into the wheel hub

Springs

- 20d-21/01 Arrangement and details of the springs (63b-13; 63c-40; 63c-41)
- 20d-21/02 Springs for trucks

20d-22 Shock and vibration absorbers for the spring-supported parts of railroad vehicles (20e; 21b-1/02; 35a-17; 47a-16/10; 47a-16/17; 63a-16; 63b-13; 63b-24; 63c-40 – 63c-42)

Wheels

20d-23 Wheel structures in general, including fastening to the axle
20d-24 Wheel tyre fastenings (for bicycles and land vehicles 63d-5; wheel tyre heating devices 49h-10)
20d-25 Spring wheels for railroad vehicles (63d-15 – 63d-17)
20d-26 Balls as substitutes for wheels in railroad vehicles
20d-27 Runners as substitutes for wheels in railroad vehicles
20d-28 Guide wheels and other anti-derailment devices for rail vehicles

Special running gear structures

20d-29 Running gear on which the railroad vehicle can be moved transversely to its longitudinal axis
20d-30 Convertible railroad vehicles to be used also on ordinary roads (20g-4; 63a-31; 63c-30; 63c-88)
20d-31 Running gears with adjustable gage or wheel base

Protective devices mounted on the vehicle for streetcar and railroad operations

20d-32 Catch nets and fenders for picking up objects or living beings from the track (63c-70)
20d-33 Track clearers for shoving aside objects or living beings on the track (63c-70)
20d-34 Safety grates, etc. between two coupled vehicles
20d-35 Safety devices to protect pedestrians crossing double track lines directly behind a train against vehicles approaching from the opposite direction

20e Couplings, draft and buffer mechanisms for railroad vehicles (for motor vehicles 63c-3/02 – 63c-3/05, 63c-13)

Couplings and accessories

20e-1 Screw couplings
20e-2 Couplings with vertically pivoted coupling members
20e-3 Couplings with horizontally pivoted coupling members
20e-4 Couplings with axially pivoted coupling members
20e-5 Couplings with vertical pins
20e-6 Couplings with horizontal pins
20e-7 Couplings with arrow-head members
20e-8 Couplings with oscillating members
20e-9 Couplings with jaw-shaped members
20e-10 Vertical-plane couplings
20e-11 Rigid knuckle couplings
20e-12 Couplings between locomotive and tender
20e-13 Couplings automatically engaged by buffer impact
20e-14 Combination couplings
20e-15 Multiple couplings: car couplings with couplings for electric lines (20l-26), with pipe and hose couplings, etc.
20e-16 Couplings for secondary and narrow gage railroad vehicles, also for mine cars
20e-17 Unusual couplings
20e-18 Coupling safety devices
20e-19 Railroad vehicle uncoupling devices, also automatic and operated from one position in the train
20e-20 Devices for coupling railroad vehicles: auxiliary couplings
20e-21 Components for couplings
20e-22 Accessories for couplings: devices for indicating the position of the couplings members, lubricating and suspension devices, etc.

Draft and buffer mechanisms

- 20e-23 Draft and buffer mechanisms, combined
- 20e-24 Draft mechanisms only
- 20e-25 Buffer mechanisms or buffers only (manufacture of buffers, etc., by forging and pressing 49i-12; spring arrangement 47a-17)

20f Brakes, mounted on railroad vehicles (track brakes, power accumulating drag shoes 20h), also electrically driven air brakes (63c-51 – 63c-57; 63i)**Brake components of railroad vehicles**

- 20f-1 Brake shoes
- 20f-2 Brake gear, details of hand brakes, etc.
- 20f-3 Brake gear, details for air brakes only or in connection with hand brakes
- 20f-4 Brake operators, e.g. brake screws, mechanical operators devices except those for air brakes (20f-39; 63a-45)
- 20f-5 Brake operators simultaneously actuating other devices, e.g. sand spreaders, doors
- 20f-6 Adjusting devices

Single brakes

- 20f-7 Switching and field railroad brakes
- 20f-8 Wheel, disk and drum brakes
- 20f-9 Brakes for adjustable axles and trucks
- 20f-10 Jaw brakes
- 20f-11 Band brakes
- 20f-12 Wedge and slipper brakes
- 20f-13 Fan brakes
- 20f-14 Spring brakes
- 20f-15 Brakes actuated by the weight of the car
- 20f-16 Miscellaneous hand brakes

Multicar brakes

- 20f-17 Group brakes, e.g. two-car, counterweight brakes
- 20f-18 Friction and clutch brakes
- 20f-19 Buffer brakes: buffers, operated by draft or safety device
- 20f-20 Special devices for brakes, operated from the tracks (20i-33 – 20i-35)
- 20f-21 Brakes for inclined railroad and hill-holder brakes
- 20f-22 Brakes for cable streetcars, hand and automatic brakes
- 20f-23 Brakes actuated upon damaging of the drive mechanism, the superstructure, or upon derailment or other accidents
- 20f-24 Brakes responsive to excessive speed
- 20f-25 Miscellaneous automatic brakes

Air, hydraulic and electromagnetic brakes

- 20f-26 Directly actuated compressed-air brakes
- 20f-27 Automatic single-chamber compressed-air brakes
- 20f-28 Control valves without quick-braking action for automatic single-chamber compressed-air brakes
- 20f-29 Quick-acting brake valves for automatic single-chamber compressed-air brakes
- 20f-30 Recharging and filling devices for the auxiliary air containers of compressed-air brakes, pressure-retaining valves, minimum pressure valves, etc., for automatic single-chamber compressed-air brakes
- 20f-31 Brake cylinder release valves for automatic single-chamber compressed-air brakes
- 20f-32 Pipe release valves for automatic single-chamber compressed-air brakes, accelerators

- 20f-33 Double compressed-air brakes: direct and automatic single-chamber compressed-air brakes, one-and two-chamber compressed-air brakes, etc., and their components
- 20f-34 Two-chamber compressed-air brakes and components
- 20f-35 Vacuum brakes and components
- 20f-36 Compressed-air streetcar brakes with axle-driven pumps
- 20f-37 Electrically controlled air brakes
- 20f-38 Air-compression brakes
- 20f-39 Motorman's brake valve for compressed-air brakes of all kinds
- 20f-40 Pump regulators and air-pressure regulating valves for air brakes (47g)
- 20f-41 Pipe and automatic pipe shutoff valves for air brakes (47f-11 – 47f-17)
- 20f-42 Special air-brake mechanisms for trains with several locomotives or motor cars
- 20f-43 Hydraulic brakes, etc.
- 20f-44 Electromagnetic brakes, eddy-current brakes (20l-29; 21d1-42)
- 20f-45 Miscellaneous locomotive brakes
- 20f-46 Unusual brakes
- 20f-47 Brake-effect indicators
- 20f-48 Emergency brake devices
- 20f-49 Brake-power regulators
- 20f-50 Accessories for air and other brakes

20g Turntables, transfer tables, water cranes, bumping posts, track transfer vehicles, freight and passenger transfer devices

- 20g-1/01 Locomotive and car turntables (63c-86)
- 20g-1/02 Transfer plates and field railroad turntables
- 20g-1/03 Turntables for suspension, cable and rack-and-pinion railroads
- 20g-1/04 Turntables for connecting inclined tracks
- 20g-3 Transfer tables
- 20g-4 Track transfer vehicles and similar moving and direction-reversing devices (63c-3)
- 20g-5 Devices for fixing and blocking land vehicles on rail cars (20h-5; 63a-44)
- 20g-6 Apparatus for boarding moving trains, cross-over devices for moving vehicles
- 20g-7 Freight transfer devices (railway operations) for standing vehicles
- 20g-8 Bumping posts (20h-4; 20h-5)
- 20g-9 Water cranes and water-filling stations for railroad operations (taking on water while in motion 20b-13)

20h Auxiliary apparatus for operation of railroads and streetcars

- 20h-1 Miscellaneous auxiliary apparatus for railroad operation, load gages devices on vehicles indicating defective track sections, tyre-measuring instruments, wheel flanges (interlocking to indicate the tracks in switching operations 20i-1; train supervision in the station 20i-41/10; workshop measuring instruments, general 42b)
- 20h-3 Power accumulating brakes for railroad vehicles (20f-38; 63a-54; 63k-8)
- 20h-4 Track brakes, track brake controlling devices, track locks, sanded sidings as part of the track and permitting transit
- 20h-5 Wheel chocks, retaining devices on the vehicle or track, drag shoes for braking and stopping (20g-5)
- 20h-6 Replacers and derailling devices, also attached to the car; lifting devices for axles, wheels, etc. for railroad service (35d-3 – 35d-8)
- 20h-7 Car movers, capstans, when their structure or arrangement is determined by railroad operation (general 35c-1)
- 20h-8 Rail-car washing devices (63a-44; 63c-91)
- 20h-9 Rail cleaners and snow ploughs for tracks (19b-6; 20l)
- 20h-10 Rail wetting devices and wheel-flange sprinklers, also built in the rail or in the street
- 20h-11 Mail bag and parcel catchers, signal disks for moving trains

20i Interlockings, switch drives, railroad gates, signals, station indicators and train safety devices of all kinds

- 20i-1 Mechanically operated interlockings for switches and signals (electrically operated interlockings 20i-11/10)
- 20i-2/01 Operating levers for switches and signals in mechanical interlockings
20i-2/10 in electrical interlockings
- 20i-3 Railroad signal structures inclusive of optical systems (4b-11; 21f-61/03; 42h-1 – 42h-9; 74d-8)
- 20i-4 Point locks and sliding locking bolts for switches
- 20i-5/01 Mechanical switch actuators
20i-5/02 Mechanical actuators for streetcar switches
20i-5/20 Mechanical signal actuators (hydraulic actuators for switches and signals 20i-10; electrical actuators 20i-11/01)
- 20i-6 Mechanical switch locking devices by means of locks or locking disks
- 20i-7 Wire -break locking devices for switches
- 20i-10 Fluid-pressure operated switches and signals (mechanical switch actuators 20i-5/01, 20i-5/02; for signals 20i-5/20)
- 20i-11/01 Electrical switch and signal actuators and circuits in connection with control (mechanical actuation 20i-5/01 – 20i-5/20; fluid-pressure actuation 20i-10)
- 20i-11/10 Electrically operated interlockings, generally, and for hump installations (mechanically operated interlockings 20i-1)
- 20i-12 Compensators and line conduits for switches and signals
- 20i-13 Electric check of switch and track signal settings, answer back when independent of the electrical actuation
- 20i-14/01 Lanterns and accessories for switches, signals and gates, independent of the means of operation (optical design 20i-3)
20i-14/10 with solid, liquid or gaseous fuels (4a-47; 74d-8/50 – 74d-8/70)
20i-14/20 with electrical illumination
- Switches controlled from the vehicle**
- 20i-15 by mechanical devices
20i-16 by fluid pressure
20i-17 by electrical devices
- Railroad gates**
- 20i-18 Railroad gate structures
- 20i-19/01 Mechanical devices for the control of railroad gates by the train
20i-19/02 Electrical devices for the control of railroad gates by the train
- 20i-20/01 Mechanical operating mechanisms and bell signals for gates
20i-20/10 Electrical operating mechanisms and bell signals for gates
- 20i-21/01 Mechanical devices for checking the proper operation of railroad gates
20i-21/10 Electrical devices for checking the proper operation of railroad gates
- 20i-22 Railroad gate with double movement
- 20i-23 Special railroad gates, lattice and sliding gates, obstacles on the road or track
- Signals on, or in the train**
- 20i-24/01 Signals on the train, also head and tail lights (4a-48; 20i-27/05)
20i-24/03 Destination signs on rail vehicles
20i-24/20 Signals in the train, respectively in cars
20i-24/30 Direction indicators for railroad vehicles (for motor vehicles 63c-69)
- Station indicators in vehicles, also direction indicators and signs in stations and on station platforms (54g-2; 54g-4 – 54g-6; 54h; 42p-11/50)**
- 20i-25/01 independent of the operation method
20i-25/10 with mechanical actuation

- 20i-26 with hydraulic or pneumatic actuation
- 20i-27 with electrical actuation (74d-8 – 74d-10)
- 20i-28/01 Mechanical manual block systems
- 20i-28/10 Electrical manual block systems
- 20i-29 Relays of special construction for railroad purposes (relays, general 21g-4/01 – 21g-4/05; 21a1-20/01 – 21a1-20/09; 21a3-61/01; 21a3-61/10; 21a3-61/20)

Train-actuated safety devices

- 20i-30/01 General mechanical train safety devices
- 20i-30/10 General electrical train safety devices
- 20i-31/01 Contact elements for signal current circuits
- 20i-31/10 Rail bonds
- 20i-31/20 Overhead line contacts
- 20i-31/30 Insulating rail connections for signal currents (for high-power current 20k-8)
- 20i-32 Treadles, detector and lock bars

Train control from the track

- 20i-33 by means of mechanical devices
- 20i-34/01 by means of electromechanical devices
- 20i-34/10 by means of photoelectric devices
- 20i-34/20 by means of phono-electric devices
- 20i-35/01 by means of electric devices regardless the method of transmission (20f-20)
- 20i-35/10 with current transfer to the vehicle
- 20i-35/20 with inductive and oscillation transmission (21a4-1/01; 21a4-21; 21a4-29/01; 74d)
- 20i-36 Automatic safety devices for electric railroads by connecting or disconnecting the operating current in the adjoining rail sections (81e-145)
- 20i-37/01 Track section signals set by the train through mechanical means
- 20i-37/10 Track section signals set by the train through electromechanical means
- 20i-37/20 Track section signals set by the train through electrical means (21c-45 – 21c-47)
- 20i-38/01 Automatic electrical track block apart from group 20i-38/10
- 20i-38/10 with inductive or magnetic control

Train protection by warning, tunnel and crossing signals

- 20i-39/01 Mechanical warning, tunnel and crossing signals and signalling devices (74d)
- 20i-39/10 Electrical warning signals [not for the train run] along the track, and tunnel signals, as well as their controls
- 20i-39/30 Electrical crossing signals and their controls
- 20i-39/40 Crossing signals with constant warning time
- 20i-39/50 Control of crossing signalling devices
- 20i-40/01 Train protection by means of mechanical devices for locking and releasing signals and traffic routes, also gravity-actuated signals
- 20i-40/10 Train protection by means of electrical devices for locking and releasing signals and traffic routes
- 20i-41/01 Electrical train protection by train traffic control apart from group 20i-41/10
- 20i-41/10 Train running control at a main office [station]
- 20i-41/20 Regulating rail traffic from a control station with remote control of switches and signals, radio classification (21c-45; 21c-47)
- 20i-41/30 Axle counters for checking and regulating rail traffic (42p-1 – 42p-10)
- 20i-42/01 Train protection in two-way traffic with side tracks, general, train-staff type protection systems
- 20i-42/10 Electrical safety devices in single track sections, automatic and semiautomatic section blocks for single track sections
- 20i-43 Train control by detonating signals, fastening of torpedoes to the rails, torpedo structures (74d-7)

- 20i-44 Control of detonating signals in dependence on other signals, devices for replacing used torpedoes (74d-7)
- 20i-45/01 Train protection by means of special mechanisms
- 20i-45/10 Train protection by means of special electrical devices

20k Current supply for electric railroads

Electric railroad systems in general

- 20k-1 System for elevated, suspension and aerial cableways of all kinds (19a-23/01; 19a-25/00; 20a-1 – 20a-17; 81e-145; 81e-157)
- 20k-2 Electric towing systems
- 20k-3 Electric railroads with travelling field
- 20k-4 Current supply to electric railroads in general (21c-67; 21c-68)
- 20k-5 Current supply to electric railroads by means of single overhead contacts
- 20k-6 Conductor system for electric railroads at bascule and swing bridges

Current conducting and insulating rail connections

- 20k-7 Conducting rail connections, including welded connections (19a-26; 19a-11/00; 21h-29 – 21h-31; 49h-25 – 49h-36)
- 20k-8 Insulating rail connections for high-voltage-current (for signal currents, 20i-31/30; 19a-8; 19a-11; 19a-11/00)

Overhead and underground conductor systems for current supply to electric railroads and electric road vehicles

- 20k-9/01 Components of aerial conductor suspension and insulation, also section insulators, tensioning devices, line connections (21c-13 – 21c-15)
- 20k-9/02 Catenary lines
- 20k-10 Switches and crossings for conductors of electric railroads
- 20k-11 Prevention of falling, grounding and disconnection of torn overhead cables in electric railroads (21c-71)
- 20k-12 Prevention of accidents from broken conductors falling on contact lines of electric railroads (21c-72)
- 20k-13 Current supply to electric railroads through conduits
- 20k-14 Current supply to electric railroads by means of a third rail
- 20k-15 Mechanically connected surface contacts: contact studs, contact rails built in street surface
- 20k-16 Surface contacts connected by means of magnets on the car
- 20k-17 Surface conductors connected by means of magnets on the track
- 20k-18 Safety system against earth currents and voltage drops, prevention of inductive disturbances in adjoining conductors, insofar as the railroad current supply is concerned (21c-68/50; 21a1-27)
- 20k-19 Scaffold cars and special tools for electric railroads (61a-1 – 61a-3)
- 20k-20 Special devices and processes for use in electrical railroad operations

20l Electric-railroad rolling stock, including devices and processes for their operation, mixed electric traction, current collectors, motors and their control safety devices, electric brakes

Devices and processes for electric-railroad operations

- 20l-1 Prevention of slipping of drive wheels by purely electrical methods (general 20b-15 – 20b-17, rail brakes 20f-44)
- 20l-2 Utilisation of brake power, electric-current regeneration (20l-28; 35b-7/06)
- 20l-3 Electric illumination by means of the operating current conducted from the outside (by current generated in the vehicle 21c-52; 21f-60/01, 21f-61/03), also electric heating of railroad vehicles regardless the source of the current (21h-9/03)

Electric and mixed electric train propulsion

Transforming electric power in the vehicle

- 20I-4/01 by conversion of the current type (21d2-10; 21d2-12; 21d2-13)
- 20I-4/02 by variation of the frequency (21d2-14)
- 20I-4/03 by variation of voltage (21d1-24; 21d2-25)
- 20I-5 Devices and circuits for train propulsion insofar as their use is dependent on alternating current (20I-23; 21d2)

Electric train propulsion by means of batteries

- 20I-6/01 Arrangement of the batteries on the vehicle (63c-1/02; batteries 21b-15 – 21b-25)
- 20I-6/02 Battery circuits and regulating devices pertaining thereto (21c-48 – 21c-51)
- 20I-6/03 Battery charging devices in the vehicle (21b-26/02)

Drives with electric transmission and mixed electric drives (general arrangement 20b-5/01, 20b-7; mechanical part of the drive mechanism 20b-10 – 20b-12; electric traction motors 20I-21) as well as their circuits and controls

- 20I-7/01 Placement of electrical machinery on the vehicle
- 20I-7/02 Electric transmissions of other kinds (general 21d1-38), especially with separated generator and motor
- 20I-7/01 Electric transmission with dynamo-electric clutch (general 21d-40 – 21d-41)
- 20I-7/02 Electrical circuitry of the machinery (63c-1/06)
- 20I-7/10 Mixed-electric drives (multi-power drives)

Current collectors, also for electric road vehicles

Current collectors with contact element rolling on the contact line (for travelling cranes 35b-7/08)

- 20I-8/01 Wheel trolleys with ball bearings
- 20I-8/02 Wheel trolleys with roller bearings
- 20I-8/03 Wheel trolleys with compound trolley wheel
- 20I-8/04 Wheel trolleys with resiliently mounted wheel
- 20I-8/05 Wheel trolleys with ice scraper
- 20I-8/06 Wheel trolleys of other kinds
- 20I-8/07 Roller trolleys

Current collectors with contact element sliding along the overhead line

- 20I-9/01 Bow current collectors
- 20I-9/02 Whip current collectors
- 20I-9/03 Sliding-shoe current collectors
- 20I-10 Current collector poles and frames of special kinds, e.g. hinged and elastic connections of components, also parallelogram frames
- 20I-11 Current collector underframes and adjusting devices
- 20I-12 Devices to prevent leaving the conductor and for the automatic replacement of runoff current collectors on the overhead line, also threaded rollers
- 20I-13 Devices for facilitating the placing of the current collector upon the conductor
- 20I-14/01 General
- 20I-14/02 Operated by compressed air or other pressure agents
- 20I-15 Motor-operated current collectors
- 20I-16 Current collectors designed to pass each other where one conductor is used for two tracks

Current collectors for bipolar or multipolar conductors, also for electric road vehicles

- 20I-17/01 for bipolar conductors

20I-17/02	for multipolar conductors
20I-18	Current collectors for slotted conduits (20k-13)
20I-19	Current collectors for third rails (20k-14)
20I-20	Current collectors for single contacts and surface contacts, also suspended contacts
	Placement of driving motor and transmission (63e-1/01)
20I-21/01	Driving motor placed perpendicularly to the travelling direction of the vehicle, nose-suspended motors
20I-21/02	Driving motor placed vertically, or parallel to or angled to the travelling direction of the vehicle
20I-21/03	Driving motor placed in the wheel of the vehicle
20I-21/04	Flexible transmissions between driving engines and driven wheels
20I-21/05	Transmission for group drive
20I-21/06	Special transmission gears and gear casings
	Electric traction motors for railroad vehicles (for road vehicles 63c-1/01)
20I-21/01	Traction motor structures, when modified by the design of the vehicle (arrangement 20b)
20I-21/02	Traction motors with reverse motion armature and field
20I-21/03	Traction motors mounted on or in the vehicle wheel, axle motors
	Control of individual railroad vehicles or road vehicles and entire trains
	Controllers for electric vehicles and special devices for same (21c-39)
20I-22/01	Drum collectors (21c-39/03)
20I-22/02	Cam-operated controllers (21c-39/04)
20I-22/03	Control handles, control wheels, foot pedals, etc. (21c-40/50)
20I-22/04	Controller casings (21c-40/06)
20I-22/05	Reciprocal locking of controller shafts (21c-41/01)
	Electric control and regulation of single railroad vehicles (20I-1 – 20I-7; 21c-45 – 21c-47; 21c-57 – 21c-62)
20I-23/01	Controlling methods
20I-23/02	Hand-controlled regulators
	Semiautomatic regulators
20I-23/03	with continuously interswitching circuit breakers
20I-23/04	with motor-driven controller shaft
20I-23/05	with ratchet-gear operated controller shaft
20I-23/06	of other types
	Fully automatic regulators
20I-23/10	with continuously interswitching circuit breakers
20I-23/11	with motor driven controller shaft
20I-23/12	with ratchet-gear operated controller shaft
20I-23/13	of other types
20I-23/20	Locking of individual components, e.g. circuit breakers
20I-23/30	Control devices for variable current type or voltage
20I-23/40	Special relays and switches for vehicle control
	Electric control and regulation of electric trains (21c-45 – 21c-47; 21c-57 – 21c-62)
20I-24/01	Control methods for two-car controls
20I-24/02	Regulators for two-car controls
20I-24/03	Control methods for multiple controls
20I-24/04	Hand-operated regulators for multiple controls
20I-24/05	Semiautomatic regulators for multiple controls

- 20I-24/06 Fully automatic regulators for multiple controls
- 20I-25 Regulators for single vehicles or entire trains, operated by compressed air or other pressure means (21c-45/09)
- 20I-26 Electric conductor couplings between vehicles (combining mechanical couplings with electric conductor couplings in rail vehicles 20e-15)

Safety and other devices and methods

- 20I-27/01 Dead man controls
- 20I-27/02 Devices for limiting speed
- 20I-27/03 Operating-current observation
- 20I-27/04 Counting or registering devices (42p)
- 20I-27/05 Indicating equipment (20i-24/01; 20i-24/20)
- 20I-27/06 Devices on the vehicle to prevent radio interference, when modifying the structure of the vehicle equipment (general 21a4-76)
- 20I-27/07 Ventilation and cooling of electrical apparatus (20c-24; 20c-25; 21d1-55 – 21d1-58; 21d2-50)
- 20I-27/08 Safety devices against handling of current collectors, doors, etc., contrary to instructions (20c-35; 20f-6)
- 20I-27/09 Safety devices to prevent excessive current or voltage (21c-68 – 21c-72)
- 20I-27/10 Regulation of auxiliary apparatus, e.g. ventilating motors

Electric-brake mechanisms

- 20I-28 Purely electric brakes, short-circuit brakes (20I-2)
- 20I-29 Regulation of mechanical or electromagnetic braking devices by elements of the electric drive equipment (structure of electromagnetic brakes 20f-44)

Special electrical equipment and processes for electric railroad vehicles (20a; 20k)

- 20I-30/01 Elevated or underground railroads
- 20I-30/02 Suspension railroads
- 20I-30/03 Monorails
- 20I-30/04 Rack-and-pinion railroads
- 20I-30/05 Towing systems
- 20I-30/06 Special railroads