

84 Hydraulic engineering, foundation laying, excavating**84 (IPC: E02) Hydraulic engineering; Foundations; Soil-shifting****84a Hydraulic engineering****84a (IPC: E02B) Hydraulic engineering****84b Ship-lifting apparatus****84b (IPC: E02C) Ship-lifting devices or mechanisms****84c Foundation works, including foundations for buildings****84c (IPC: E02D) Foundations****84d Excavators****84d (IPC: E02F) Dredging; Soil-shifting****84a Hydraulic engineering**

84a-1 River regulation and torrent control, blasting of rocks, clearing of water courses (elimination of shoals by dredging 84d)

84a-2 Stabilisation of coasts and banks

Construction of weirs including log sluices and fishways

84a-3/01 Weir flashboards, fixed weirs

84a-3/02 Energy dissipaters

84a-3/03 Stop log weirs

84a-3/04 Needle weirs

84a-3/05 Shutter weirs

84a-3/06 Sliding gates

84a-3/07 Rolling gates

84a-3/08 Cylinder gates

84a-3/09 Taintor gates

84a-3/10 Hinged-leaf weirs with the axis of rotation at the top or at the bottom

84a-3/11 Hinged-leaf weirs with the axis of rotation in the middle

84a-3/12 Drum weirs

84a-3/13 Roller weirs

84a-3/14 Independent level controls

84a-3/15 Siphon spillways

84a-3/16 Fishways and log sluices

84a-3/17 Dams with turbines

84a-4/01 Dike and sluiceway construction

84a-4/02 Barrages, gates and other accessories belonging to the hydraulic engineering part

84a-5/01 Harbour and marine engineering

84a-5/02 Canal construction

84a-5/03 General hydraulic-engineering works

84a-6/01 Races and accessories, e.g. inlet gratings for water-power plants (88a-10 – 88a-12; 85c-6/06)

84a-6/02 Pressure pipe lines

84a-7/01 Irrigation and drainage of agricultural land (water supply systems 85d-1; apparatus and devices for digging ditches 84d-6/01 – 84d-6/04; soil irrigation and sprinkling 45f-25/00 – 45f-25/04)

84a-7/02 Drainage apparatus with underground propelled tools, mole ploughs

84a (IPC: E02B) Hydraulic engineering, e.g. stream regulation, groynes, dykes, dams, weirs, harbour engineering, canals, water rakes, reclamation of land

84a-1/00 Equipment or apparatus for, or methods of, general hydraulic engineering

84a-1/02 . Hydraulic models

84a-3/00 Engineering work in connection with control or use of streams, rivers, coasts, or other marine sites (barrages or weirs 84a-7/00); Sealing or joints for engineering work in general

84a-3/02 . Stream regulation, e.g. breaking up subaqueous rock, cleaning the beds of waterways, directing the water flow (dredging or scraping devices 84d)

84a-3/04 . Structures or apparatus for, or methods of, protecting banks, coasts, or harbours (sealings or joints 84a-3/16)

84a-3/06 . . Moles; Piers; Quays; Quay walls; Groynes; Breakwaters

84a-3/08 . . . Structures of loose stones with or without piles (piles 84c-5/00)

84a-3/10 . . Dams; Dykes; Sluice ways or other structures for dykes, dams, or the like (making embankments or dams in general 84c-17/18)

84a-3/12 . . Revetment of banks, dams, watercourses, or the like (of slopes in general 84c-17/20)

84a-3/14 . . . Preformed blocks; Arrangements thereof

84a-3/16 . Sealings or joints (joints for foundation structures 84c-29/16)

84a-3/18 . Reclamation of land from water

84a-3/20 . Equipment for shipping in harbours or on coasts

84a-3/22 . . Mooring posts or bollards; Fenders; Fender piles

84a-5/00 Artificial water canals (for water-power plants 84a-9/00)

84a-5/02 . Making or lining canals

84a-5/04 . Navigable canals

84a-5/06 . . Operating equipment in connection with canals (ship-lifting devices 84b)

84a-5/08 . Details, e.g. gates, screens

84a-7/00 Barrages or weirs; Layout, construction, methods of, or devices for, making (sealings or joints 84a-3/16; handling building or like materials for hydraulic engineering 84c-15/00; foundations in general 84c-27/00)

84a-7/02 . Fixed barrages

84a-7/04 . . Dams across valleys

84a-7/06 . . . Earth-fill dams; Rock-fill dams

84a-7/08 . . . Wall dams

84a-7/10 Gravity dams, i.e. those in which the weight of the structure prevents overturning

84a-7/12 Arch dams

84a-7/14 Buttress dams

84a-7/16 . Fixed weirs; Superstructures or flash-boards therefor

84a-7/18 . . Siphon weirs

84a-7/20 . Movable barrages; Lock gates

84a-7/22 . . Stop log dams; Emergency gates

84a-7/24 . . Needle weirs

84a-7/26 . . Vertical-lift gates

84a-7/28 . . . with sliding gates

84a-7/30 . . . with guide wheels or rollers for the gates

84a-7/32 . . . Cylindrical or tubular gates

84a-7/34 . . . Flash-boards for vertical-lift gates

84a-7/36 . . . Elevating mechanisms for vertical-lift gates

84a-7/38 . . Rolling gates

- 84a-7/40 . . . Swinging or turning gates
- 84a-7/42 Gates of segmental or sector-like shape with horizontal axis
- 84a-7/44 Hinged-leaf gates
- 84a-7/46 Gates turning round a horizontal axis arranged midway of the flap
- 84a-7/48 Roof or double shutter gates
- 84a-7/50 . . . Floating gates
- 84a-7/52 . . . Equipment preventing vibration of gates
- 84a-7/54 . . . Sealings for gates
- 84a-7/56 . . . Sediment base gates; Sand sluices; Structures for arresting waterborne material
- 84a-7/58 . . . Valves, slides, or the like (in general 47g); Submerged sluice gates
- 84a-7/60 . . . Spillways; Devices for dissipation of energy, e.g. for reducing eddies
- 84a-7/62 . . . Fish passes; Passages for rafts or boats

84a-8/00 Details of barrages or weirs

- 84a-8/02 . . . Sediment base gates; Sand sluices; Structures for arresting waterborne material
- 84a-8/04 . . . Valves, slides, or the like; Submerged sluice gates
- 84a-8/06 . . . Spillways; Devices for dissipation of energy, e.g. for reducing eddies
- 84a-8/08 . . . Fish passes; Passages for rafts or boats

84a-9/00 Water-power plants; Lay-out, construction or equipment, methods of, or apparatus for, making (hydraulic motors 88a)

- 84a-9/02 . . . Water-ways
- 84a-9/04 Free-flow canals or flumes; Intakes
- 84a-9/06 Galleries, conduits; Penstocks, or the like for pressure conduits
- 84a-9/08 . . . Tide or wave power plants (water-pressure machines, tide or wave motors 88b)

84a-11/00 Drainage of soil, e.g. for agricultural purposes

- 84a-11/02 . . . Drainage ploughs

84a-13/00 Irrigation of soil, e.g. for agricultural purposes

- 84a-13/02 . . . Closures for irrigation conduits

84a-15/00 Cleaning or keeping clear the surface of open water

- 84a-15/02 . . . from ice (construction of ships 65a1)
- 84a-15/04 . . . from oil or the like

84a-17/00 Artificial islands mounted on piles or like supports, e.g. platforms on raisable legs; Construction methods therefor (anchoring thereof 65a-21/00; floating platforms, e.g. anchored, 65a-35/44; for making foundations 84c-21/00)

- 84a-17/02 . . . placed by lowering the supporting construction to the bottom, e.g. with subsequent fixing thereto
- 84a-17/04 . . . Equipment specially adapted for raising, lowering, or immobilising the working platform relative to the supporting construction (platform lifts in general 35d-7/00)
- 84a-17/06 for immobilising, e.g. using wedges or clamping rings
- 84a-17/08 for raising or lowering

84b Ship-lifting apparatus

- 84b-1 . . . Locks, gates and other equipment (log sluices 84a-3/16)
- 84b-2 . . . Apparatus for vertical ship-lifting
- 84b-3 . . . Inclined-plane ship-lifting apparatus, ship railways

84b (IPC: E02C) Ship-lifting devices or mechanisms**84b-1/00 Locks; Shaft locks, i.e. locks of which one front side is formed by a solid wall with an opening in the lower part through which the ships pass (lock gates 84a-7/20)**

- 84b-1/02 . . . with auxiliary basins
- 84b-1/04 . . . with floating troughs
- 84b-1/06 . . . Devices for filling or emptying locks (in lock gates 84a-7/20)
- 84b-1/08 . . . Arrangements for dissipating the energy of the water (carried by lock gates 84a-8/06)

84b-1/10	. Equipment for use in connection with the navigation of ships in locks; Mooring equipment (in general 84a-3/22)
84b-3/00	Inclined-plane ship-lifting mechanisms
84b-5/00	Mechanisms for lifting ships vertically
84b-5/02	. with floating chambers
84c	Foundation works, including foundations for buildings
84c-1	Ground testing and consolidation, excavating, excavation shoring, earth borers (5c-3; 45f-4/09; 5a-21)
84c-2	Foundations for building structures, bottom enlargement, pile work and ground joists, sheet piling, piles and pile shoes (37b-3/01 – 37b-3/03)
84c-3	Caissons, dry open caissons, compressed-air foundations, diving bells (65b-7), stone and concrete sinking
84c-4	Pile drivers (19c-9/01; 19c-9/10), ram heads, devices for pulling out piles, rammers for concrete (80a-14; 80a-34)
84c-5	Under-water tunnels, under-pavement tunnels (19f)
84c-6	Chemical methods for the consolidation of loose ground layers and the reconsolidation of decayed building structures and materials (5c-1/01; 5c-1/20; 5c-1/30; 19f-1; 37a-7/01; 37a-7/04; 37a-7/05; 80b-19/01; 80b-19/02; 80b-19/05; 80b-19/07; 84c-1)
84c	(IPC: E02D) Foundations
84c-1/00	Investigation of foundation soil in situ
84c-1/02	. before construction work
84c-1/04	. . Sampling of soil (sampling in general 42l)
84c-1/06	. . Sampling of ground water
84c-1/08	. after finishing the foundation structure
84c-3/00	Improving the foundation soil
84c-3/02	. Consolidating the soil by compacting the soil particles (consolidating soil locally 84c-27/26, 84c-27/28)
84c-3/04	. . by rolling or tamping, e.g. by vibratory rolling (rollers and tampers for the construction of roads or the like 19c-19/23 – 19c-19/41)
84c-3/06	. . by vibrating (vibrators for making road or like surfaces 19c-9/38, 19c-19/40)
84c-3/08	. . by inserting bodies, such as stones or piles
84c-3/10	. . by watering, draining, de-aerating, or blasting
84c-3/12	. Consolidating by placing solidifying or pore-filling substances in the soil (making piles 84c-5/46)
84c-3/14	. Chemical substances for improving foundation soil
84c-5/00	Structural elements for foundation engineering; Bulkheads or the like
84c-5/02	. Sheet piles or sheet pile bulkheads
84c-5/04	. . Prefabricated parts
84c-5/06	. . . made of steel
84c-5/08	. . . . Fitted piles or other elements specially adapted for closing gaps between two sheet piles or between two walls of sheet piles
84c-5/10	. . . . Locking forms; Edge joints; Pile crossings; Branch pieces Prefabricated parts
84c-5/12	. . . made of concrete or reinforced concrete
84c-5/14	. . . . Locking forms; Edge joints; Pile crossings; Branch pieces
84c-5/16	. . . Sealing joints between adjacent piles
84c-5/18	. . . Auxiliary devices rigidly or detachably arranged on sheet piles for facilitating assembly
84c-5/20	. Bulkheads or similar walls made solely of concrete in situ
84c-5/22	. Bulkheads or similar walls made of prefabricated parts and concrete, including reinforced concrete, in situ
84c-5/24	. Piles (sheet piles 84c-5/02)
84c-5/26	. . Prefabricated piles
84c-5/28	. . . made of timber with or without reinforcement; Means affording protection against spoiling of the wood (cases 84c-5/60; impregnating agents 38h); Self-cleaning of piles placed in water

- 84c-5/30 . . . made of steel
- 84c-5/32 . . . made of concrete or reinforced concrete or made of steel and concrete
- 84c-5/34 . . . with arrangements for setting in position by fluid jets
- 84c-5/36 . . Concrete or concrete-like piles cast in position
- 84c-5/38 . . . making without use of mould-pipes or other moulds
- 84c-5/40 . . . making by use of mould-pipes or other moulds
- 84c-5/42 in open water
- 84c-5/44 by making use of pressure liquid or pressure gas for compacting the concrete
- 84c-5/46 with enlarged footing or enlargements at the bottom of the pile
- 84c-5/48 . . . making in situ by forcing bonding agents into gravel fillings or the soil
(consolidating soil in general 84c-3/12)
- 84c-5/50 . . Piles varying in construction along their length
- 84c-5/52 . . Piles comprising both precast concrete portions and concrete portions cast in situ
- 84c-5/54 . . Piles composed of separable parts, e.g. telescopic tubes
- 84c-5/56 . . Piles with prefabricated supports or anchoring parts; Anchoring piles
- 84c-5/58 . . Screw piles
- 84c-5/60 . . Prestressed concrete piles
- 84c-5/62 . . Piles with protecting cases
- 84c-5/64 . . Compacting the soil at the footing or in a casing by forcing cement or like material
through tubes
- 84c-5/66 . . Repairing piles
- 84c-5/68 . Mould-pipes or other moulds
- 84c-5/70 . . for making bulkheads
- 84c-5/72 . . for making sheet piles
- 84c-5/74 . Pile shoes
- 84c-5/76 . Means for anchoring structural elements or bulkheads (anchoring piles 84c-5/56)
- 84c-5/78 . . Anchorings for bulkheads or sections thereof
- 84c-5/00 Structural elements for foundation engineering; Bulkheads or the like**
- 84c-5/02 . Sheet piles or sheet pile bulkheads
- 84c-5/03 . . Prefabricated parts
- 84c-5/04 . . . made of steel
- 84c-5/06 Fitted piles or other elements specially adapted for closing gaps between two
sheet piles or between two walls of sheet piles
- 84c-5/08 Locking forms; Edge joints; Pile crossings; Branch pieces
- 84c-5/10 . . . made of concrete or reinforced concrete
- 84c-5/12 Locking forms; Edge joints; Pile crossings; Branch pieces
- 84c-5/14 . . Sealing joints between adjacent piles
- 84c-5/16 . . Auxiliary devices rigidly or detachably arranged on sheet piles for facilitating
assembly
- 84c-5/18 . Bulkheads or similar walls made solely of concrete in situ
- 84c-5/20 . Bulkheads or similar walls made of prefabricated parts and concrete, including
reinforced concrete, in situ
- 84c-5/22 . Piles (sheet piles 84c-5/02)
- 84c-5/24 . . Prefabricated piles
- 84c-5/26 . . . made of timber with or without reinforcement; Means affording protection against
spoilage of the wood (cases 84c-5/60; impregnating agents 38h); Self-cleaning of
piles placed in water
- 84c-5/28 . . . made of steel
- 84c-5/30 . . . made of concrete or reinforced concrete or made of steel and concrete
- 84c-5/32 . . . with arrangements for setting in position by fluid jets
- 84c-5/34 . . Concrete or concrete-like piles cast in position
- 84c-5/36 . . . making without use of mould-pipes or other moulds
- 84c-5/38 . . . making by use of mould-pipes or other moulds
- 84c-5/40 in open water
- 84c-5/42 by making use of pressure liquid or pressure gas for compacting the concrete
- 84c-5/44 with enlarged footing or enlargements at the bottom of the pile
- 84c-5/46 . . . making in situ by forcing bonding agents into gravel fillings or the soil
(consolidating soil in general 84c-3/12)
- 84c-5/48 . . Piles varying in construction along their length
- 84c-5/50 . . Piles comprising both precast concrete portions and concrete portions cast in situ

84c-5/52	. . Piles composed of separable parts, e.g. telescopic tubes
84c-5/54	. . Piles with prefabricated supports or anchoring parts; Anchoring piles
84c-5/56	. . Screw piles
84c-5/58	. . Prestressed concrete piles
84c-5/60	. . Piles with protecting cases
84c-5/62	. . Compacting the soil at the footing or in a casing by forcing cement or like material through tubes
84c-5/64	. . Repairing piles
84c-5/66	. Mould-pipes or other moulds
84c-5/68	. . for making bulkheads
84c-5/70	. . for making sheet piles
84c-5/72	. Pile shoes
84c-5/74	. Means for anchoring structural elements or bulkheads (anchoring piles 84c-5/54)
84c-5/76	. . Anchorings for bulkheads or sections thereof
84c-5/80	. . Ground anchors

Methods or apparatus for placing or removing structural elements

84c-7/00 Methods or apparatus for placing sheet pile bulkheads, piles, mould-pipes, or other moulds (for both placing and removing 84c-11/00)

84c-7/02	. Placing by driving
84c-7/04	. . Hand pile-drivers
84c-7/06	. . Power-driven drivers
84c-7/08	. . . Drop drivers with free-falling hammer
84c-7/10	. . . with pressure-operated hammer
84c-7/12	. . . Drivers with explosion chambers
84c-7/14	. . . Components for drivers
84c-7/16	. . . . Scaffolds for drivers
84c-7/18	. Placing by vibrating
84c-7/20	. Placing by pressure or pulling power
84c-7/22	. Placing by screwing down
84c-7/24	. Placing by using fluid jets
84c-7/26	. Placing by using several means simultaneously
84c-7/28	. Placing of hollow piles or mould-pipes by means arranged inside the piles or pipes
84c-7/30	. . by driving cores

84c-9/00 Removing sheet pile bulkheads, piles, mould-pipes, or other moulds

84c-9/02	. by withdrawing
84c-9/04	. by cutting-off under water

84c-11/00 Methods or apparatus for both placing and removing sheet pile bulkheads, piles, or mould-pipes

84c-13/00 Accessories for placing or removing piles or bulkheads

84c-13/02	. specially adapted for placing or removing bulkheads
84c-13/04	. Guide devices; Guide frames
84c-13/06	. for observation while placing
84c-13/08	. Removing obstacles
84c-13/10	. Follow-blocks of pile-drivers or like devices

84c-15/00 Handling building or like materials for hydraulic engineering or foundations (working-up concrete or similar masses in general 37a, 37e, 80a, 80b; conveying concrete in general 81e)

84c-15/02	. Handling of bulk concrete specially for foundation purposes
84c-15/04	. . Placing concrete in mould-pipes, pile tubes, boreholes, or narrow shafts
84c-15/06	. . Placing concrete under water
84c-15/08	. Sinking work-pieces into water or soil
84c-15/10	. Placing gravel or light material under water

84c-17/00 Excavations; Bordering of excavations; Making embankments (soil shifting apparatus 84d)

84c-17/02	. Foundation pits
84c-17/04	. . Bordering or stiffening the sides of foundation pits

84c-17/06	. Foundation ditches or narrow shafts
84c-17/08	. . Bordering or stiffening the sides of ditches or narrow shafts for foundations
84c-17/10	. . Covering trenches for foundations
84c-17/12	. . Back-filling of foundation trenches or ditches
84c-17/13	. Foundation slots; Implements for making these slots
84c-17/14	. Boreholes for foundations; Implements for making these holes
84c-17/142	. . boring substantially vertically (84c-17/149 takes precedence)
84c-17/144	. . . by augers
84c-17/146	. . boring substantially horizontally (84c-17/149 takes precedence)
84c-17/148	. . enlarging holes in diameter, e.g. partially (84c-17/149 takes precedence)
84c-17/149	. . Hand-operated devices
84c-17/16	. Loosening of soil or rock, under water (for correcting streams 84a-3/02; by dredgers or excavators 84d)
84c-17/18	. Making embankments (84c-17/20 takes precedence)
84c-17/20	. Securing of slopes or inclines
84c-19/00	Keeping dry foundation sites or other areas in the ground (sheet piles or bulkheads 84c-5/02)
84c-19/02	. Restraining of open water
84c-19/04	. . by coffer-dams
84c-19/06	. Restraining of underground water
84c-19/08	. . by employing open ditches arranged below the level of the water
84c-19/10	. . by lowering level of ground water
84c-19/12	. . by damming or interrupting the passage of underground water
84c-19/14	. . . by freezing the soil (in connection with sinking shafts 5c-2)
84c-19/16	. . . by placing or applying sealing substances (improving soil by chemical substances 84c-3/14)
84c-19/18	. . . by making use of sealing aprons (sealing or joints for engineering work 84a-3/16)
84c-19/20	. . . by displacing the water, e.g. by compressed air
84c-19/22	. Lining sumps in trenches
84c-21/00	Platforms for mounting tools above water level or above watery ground (artificial islands mounted on piles or like supports, platforms on legs in general 84a-17/00)
84c-23/00	Caissons; Construction or placing of caissons (prefabricated tunnel elements 19f-3/10)
84c-23/02	. Caissons able to be floated on water and to be lowered into water in situ
84c-23/04	. Pneumatic caissons
84c-23/06	. . Bringing persons or material into or out of compressed air caissons
84c-23/08	. Lowering or sinking caissons
84c-23/10	. . Caissons filled with compressed air
84c-23/12	. . Inclined lowering
84c-23/14	. . Decreasing the skin friction while lowering
84c-23/16	. Jointing caissons to the foundation soil, specially to uneven foundation soil
84c-25/00	Joining caissons, sinkers, or other units to each other under water
84c-27/00	Foundations as substructures
84c-27/01	. Flat foundations
84c-27/02	. . Flat foundations without substantial excavation
84c-27/04	. . in water or on quicksand
84c-27/06	. . . Floating caisson foundations
84c-27/08	. . Reinforcements for flat foundations
84c-27/10	. Deep foundations
84c-27/12	. . Pile foundations
84c-27/14	. . . Pile framings
84c-27/16	. . . Foundations formed of separate piles
84c-27/18	. . Foundations formed by making use of caissons
84c-27/20	. . Caisson foundations combined with pile foundations

84c-27/22	. . Caisson foundations made by starting from fixed or floating artificial islands by using protective bulkheads
84c-27/24	. Foundations constructed by making use of diving-bells
84c-27/26	. Compacting soil locally before forming foundations; Construction of foundation structures by forcing binding substances into gravel fillings (consolidating foundation soil in general 84c-3/02 to 84c-3/14)
84c-27/28	. Stressing the soil or the foundation structure while forming foundations
84c-27/30	. Foundations made with permanent use of sheet pile bulkheads, walls of planks, or sheet piling boxes
84c-27/32	. Foundations for special purposes
84c-27/34	. . Foundations for sinking or earthquake territories (building constructions with protection arrangements against earthquakes 37f)
84c-27/36	. . Foundations formed in moors or bogs
84c-27/38	. . Foundations for large tanks, e.g. oil tanks
84c-27/40	. . Foundations for dams across valleys or for dam constructions
84c-27/42	. . Foundations for poles, masts, or chimneys
84c-27/44	. . Foundations for machines, engines, or ordnance (special lay-out of foundations with respect to machinery to be supported 47a-16/01, 47a2-9/00)
84c-27/46	. . Foundations for supply conduits or other canals
84c-27/48	. . Foundations inserted underneath existing buildings or constructions
84c-27/50	. . Anchored foundations
84c-27/52	. . Submerged foundations
84c-29/00	Independent underground or underwater structures; Retaining walls (sealings for engineering work 84a-3/16; constructing tunnels 19f)
84c-29/02	. Retaining or protecting walls (piers or quay walls 84a-3/06)
84c-29/04	. Construction for underground plants
84c-29/06	. Constructions, or methods of constructing, in water
84c-29/08	. Siphons (siphon weirs 84a-7/18; for sewerage 85e)
84c-29/10	. Housings for supply lines or sewer pipes; Canals or conduits made in situ; Casings or coverings of boreholes or narrow wells
84c-29/12	. . Manhole shafts; Other inspection or access chambers; Accessories (for sewerage 85e)
84c-29/14	. . . Covers for manholes or the like; Frames for covers
84c-29/16	. Arrangement or construction of joints in foundation structures
84c-31/00	Protective arrangements for foundations or foundation structures; Ground foundation measures for protecting the soil or the subsoil water, e.g. against pollution by oil
84c-31/02	. against ground humidity or ground water
84c-31/04	. . Watertight packings for use under hydraulic pressure
84c-31/06	. against corrosion by soil or water
84c-31/08	. against transmission of vibrations or movements in the foundation soil
84c-31/10	. against soil pressure or hydraulic pressure
84c-31/12	. . against upward hydraulic pressure
84c-33/00	Testing foundations or foundation structures, e.g. measuring of stress
84c-35/00	Straightening, lifting, or lowering of foundation structures and of constructions erected on foundations
84c-37/00	Repairs of damaged foundations or foundation structures
84d	Excavators (peat excavators 10c-1; clay excavators 80a-1; drainage ploughs 45a-44; extracting apparatus for open-pit mining 5b-41)
84d-1/01	Hand excavators (hand implements for ground working 45a-1 – 45a-5)
84d-1/02	Screw excavators (worm conveyors 81e-23, 81e-24; cultivators 45a-44; ditch or trench ploughs 45a-20)
84d-1/03	Bucket-wheel excavators
84d-1/05	Cable tower shovels, bridge-type dragline excavators (cable cranes 35b-1)
84d-1/06	Scrapers, drive, steering, structure and releasing devices for the scraper scoop

84d-2	Bucket-chain excavators, dry and wet excavators, shallow and deep excavators, revolving excavators, running gear (bucket conveyors 81e-25 – 81e-44; running gear for locomotives and railway cars 20b, 20c; under-frames 20d; for cranes 35b; for motor vehicles 63c-37; for dumpers 81e; caterpillar tractors 45a, 5300; chain or belt tracks for vehicles 63c-30)
84d-3	Power shovels, running gear
84d-4	Suction and delivery pump excavators, compressed air and pressurised water excavators, soil suction and pumping plants, combined apparatus (liquid pumps and other liquid-lifting devices 59a, 59b, 59c)
	Apparatus for conveying and separating excavated materials
84d-5/01	Dredger vessels (freighters 65a1-1; pumping and flooding devices 65a2-42)
84d-5/02	Conveying arrangements built in, or fixed to, the excavator (conveyor belts 81e-1 – 81e-21)
84d-5/03	Chutes and screening arrangements built in, or fixed to, the excavator (chutes 81e-45 – 81e-59; discharge hoppers 81e-134 – 81e-136; screen drums and sorting drums 1a-20 – 1a-27)
84d-5/04	Pipes for the removal of the excavated material (pipe lines, pipes and hoses, joint elements 47f-1 – 47f-17)
84d-6/01	Trench- or ditch-digging equipment in general; hand implements
84d-6/02	Trench- or ditch-digging equipment with wormlike tools
84d-6/03	Trench- or ditch-digging equipment with bucket wheels
84d-6/04	Trench- or ditch-digging equipment with bucket chains

84d	(IPC: E02F) Dredging; Soil-shifting (winning peat 5b-49/00, 10c)
84d-1/00	General working methods with dredgers or soil-shifting machines (methods for making embankments 84c-17/18; methods for mining 5b)
84d-3/00	Dredgers; Soil-shifting machines (for special purposes 84d-5/00; machines or apparatus for mining 5b; for construction of tunnels 19f)
84d-3/02	. hand-operated
84d-3/04	. mechanically-driven
84d-3/06	. . with digging screws
84d-3/08	. . with digging elements on an endless chain (conveyers 81e)
84d-3/10	. . . with tools that only loosen the material
84d-3/12	. . . Component parts
84d-3/14	. . . . Buckets; Chains; Guides for buckets or chains; Drives for chains
84d-3/16	. . . . Safety or control devices
84d-3/18	. . with digging wheels turning round an axis
84d-3/20	. . . with tools that only loosen the material
84d-3/22	. . . Component parts
84d-3/24	. . . . Digging wheels; Digging elements of wheels; Drives for wheels
84d-3/26	. . . . Safety or control devices
84d-3/28	. . with digging tools mounted on a dipper-arm; Dippers (84d-3/62 takes precedence)
84d-3/30	. . . with a dipper-arm pivoted on a cantilever beam
84d-3/32	. . . . working downwardly and towards the machine
84d-3/34	. . . with a dipper-arm directly pivoted on the frame
84d-3/36	. . . Component parts
84d-3/38	. . . . Cantilever beams; Dipper-arms
84d-3/40	. . . . Dippers
84d-3/42	. . . . Drives for dippers or dipper-arms
84d-3/44	. . with grab buckets (84d-3/62 takes precedence; grab equipment for cranes 35b)
84d-3/46	. . with reciprocating digging or scraping elements moved by cables or hoisting ropes
84d-3/48	. . . Drag-lines
84d-3/50	. . . with buckets or other digging elements moved along a rigid guideway
84d-3/52	. . . Cableway excavators (cable cranes 35b)
84d-3/54	. . . Cable scrapers
84d-3/56	. . . . with hand-controlled scraper or other digging elements
84d-3/58	. . . Component parts

84d-3/60	. . . . Buckets, scrapers, or other digging elements
84d-3/62	. . drawn by a tractor or directly mounted on a tractor; Similar self-propelled machines; Skimmers, e.g. levelling apparatus
84d-3/64	. . . with scraper buckets (as loaders 81e); Bucket cars
84d-3/66	. . . Graders with scraper plates or ploughshare-like elements, e.g. road graders, "bulldozers" (soil working 45a)
84d-3/68	. . . with rotating digging elements
84d-3/70	. . . Details
84d-3/72	. . . Driving arrangements
84d-3/74	. . with arrangements acting by a sucking or forcing effect (pumps in general 59)
84d-3/76	. . . Details
84d-3/78	. . . . Digging elements, e.g. suction heads
84d-3/80	. . . . Apparatus for separating stones from the dredged material
84d-3/82	. . with arrangements for alternate use of different digging elements
84d-3/64	. . . with scraper buckets or forks; Bucket cars
84d-3/66	. . . . with jiggling buckets
84d-3/68	. . . . with buckets movable along a fixed guide on the tractor chassis
84d-3/70	. . . . with buckets mounted on an arm connected to the tractor chassis
84d-3/72	. . . . the arm being swingably mounted, e.g. on a turn-table (84d-3/75 takes precedence)
84d-3/74	. . . . the arm being pivoted on a cantilever beam mounted on the tractor chassis
84d-3/75	. . . . . the beam being swingably mounted, e.g. on a turn-table
84d-3/76	. . . Graders, bulldozers, or the like with scraper plates or ploughshare-like elements (soil-working 45a)
84d-3/78	. . . with rotating digging elements
84d-3/80	. . . Component parts
84d-3/81	. . . . Buckets or forks
84d-3/82	. . . . for emptying buckets by tilting
84d-3/83	. . . . . by tilting sideways
84d-3/84	. . . . Drives or control devices therefor
84d-3/85	. . . . . Applications of hydraulic or pneumatic systems
84d-3/86	. . . . . for controlling bucket position
84d-3/87	. . . . . for controlling sequence of operations
84d-3/88	. . with arrangements acting by a sucking or forcing effect (pumps in general 59)
84d-3/90	. . . Component parts
84d-3/92	. . . . Digging elements, e.g. suction heads
84d-3/94	. . . . Apparatus for separating stones from the dredged material
84d-3/96	. . with arrangements for alternate use of different digging elements

84d-5/00	Dredgers or soil-shifting machines for special purposes
84d-5/02	. for digging trenches or ditches (agricultural ploughs for working ridges 45a-13/02)
84d-5/04	. . with digging screws
84d-5/06	. . with digging elements mounted on an endless chain
84d-5/08	. . with digging wheels turning round an axis
84d-5/10	. . with arrangements for reinforcing trenches or ditches; with or without arrangements for assembling piping or cables
84d-5/12	. . with equipment for back-filling trenches or ditches
84d-5/14	. . Component parts for trench excavators, e.g. indicating devices
84d-5/16	. Machines for digging other holes in the soil (making earth borings for foundations 84c-17/14; deep drilling 5a)
84d-5/18	. . for horizontal holes
84d-5/20	. . for vertical holes
84d-5/22	. for making embankments; for back-filling (in combination with trench excavators 84d-5/12)
84d-5/24	. . Depositing dredged material in mounds
84d-5/26	. . Combined conveying-bridges and dredgers
84d-5/28	. for cleaning watercourses or other waters
84d-5/30	. Auxiliary apparatus, e.g. for thawing, cracking, blowing-up, or other preparatory treatment of the soil

84d-7/00	Equipment for conveying or separating excavated material
84d-7/02	. Conveying equipment mounted on a dredger (conveyers in general 81e)
84d-7/04	. Loading devices mounted on a dredger (loading devices in general 81e)
84d-7/06	. Delivery chutes or screening plants mounted on a dredger (separating equipment in general 1a, 1b, 1e; delivery chutes in general 81e)
84d-7/10	. Pipelines for conveying excavated materials (pipes or pipe-line systems in general 47f)
84d-9/00	Component parts for dredgers, depositing machines, or like apparatus, not otherwise provided for (laying-out or take-up devices for trailing electric cables 35b)
84d-9/02	. Travelling-gear (for motor vehicles 63c, 63d; undercarriages for locomotives or railroad cars 20d; for cranes 35b)
84d-9/04	. . Walking gears moving the dredger forward step-by-step
84d-9/06	. Floating substructures as supports
84d-9/08	. Superstructures; Supports for superstructures
84d-9/10	. . Supports for movable superstructures mounted on travelling or walking gears or on other superstructures
84d-9/12	. . . Slewing or traversing gears (roller and ball bearings 47b)
84d-9/14	. Booms; Cable suspensions
84d-9/16	. Cabins, platforms, etc. for the driver
84d-9/18	. Counterweights
84d-9/20	. Drives; Control devices (gearing in general 47h; electric multi-motor drives 21c)
84d-9/22	. . Hydraulic or pneumatic drives
84d-9/24	. Safety devices
84d-9/26	. Indicating devices
84d-9/28	. Small metalwork for digging elements, e.g. teeth