E21F  SAFETY DEVICES, TRANSPORT, FILLING-UP, RESCUE, VENTILATION, OR DRAINING IN OR OF MINES OR TUNNELS

WARNING
In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.

Ventilation of mines or tunnels
1/00  Ventilation of mines or tunnels; Distribution of ventilating currents (ventilating rooms or spaces in general F24F)
      1/003  .  (Ventilation of traffic tunnels (during construction E21F 1/04 - E21F 3/00))
      1/006  .  (Ventilation at the working face of galleries or tunnels)
      1/02  .  Test models (analogue computers therefor G06G 7/50)
      1/04  .  Air ducts (suspension devices E21F 17/02)
      1/06  .  .  Duct connections (tube connections in general F16L)
      1/08  .  .  Ventilation arrangements in connection with air ducts, e.g. arrangements for mounting ventilators (E21F 1/003 takes precedence); ventilators in general F04D)
      1/085  .  .  [using compressed gas injectors]
      1/10  .  .  Air doors (E21F 1/003 takes precedence; air locks E21F 1/145; dam doors E21F 17/12); doors in general E06B)
      1/12  .  .  Devices for automatically opening air doors
      1/14  .  .  Air partitions; Air locks (E21F 1/003 takes precedence); dams E21F 17/103; air locks for foundations E02D)
      1/145  .  .  [Air locks (air doors E21F 1/10; dam doors E21F 17/12)]
      1/16  .  .  Shaft covers
      1/18  .  .  Gravity flow ventilation (E21F 1/02 - E21F 1/16 take precedence)
   3/00  Cooling or drying of air (air-conditioning rooms or spaces in general F24F)

Safety devices (flue-gas indicators G01N); Rescue devices
5/00  Means or methods for preventing, binding, depositing, or removing dust (in combination with mining machines E21C 35/22); Preventing explosions or fires (dams E21F 17/103; applying liquids or other fluent materials to surfaces in general B05)
      5/02  .  .  by wetting or spraying
      5/04  .  .  Spraying barriers (spray nipples, spraying in general B05B, B05D; picks with arrangements of fluid-spraying nozzles E21C 35/187)
      5/06  .  .  Fluids used for spraying
      5/08  .  .  Rock dusting of mines; Depositing other protective substances
      5/10  .  .  Devices for rock dusting
      5/12  .  .  Composition of rock dust
      5/14  .  .  Fluid barriers or rock dusters made to work by, or at the same time as, shots or explosions
      5/143  .  .  [Fluid barriers]
      5/146  .  .  [Rock dusters]
      5/16  .  .  Layers of hygroscopic or other salts deposited on floors, walls, or the like, for binding dust; Deposition of such layers (dust-absorbing materials in general C09K 3/22)
      5/18  .  .  Impregnating walls, or the like, with liquids for binding dust ([injections for improving soil or rock E21D 9/001; borehole closures, i.e. packers, for use during the injection process E21B 33/12])
      5/20  .  .  Drawing-off or depositing dust ([dust-removing while drilling E21B 21/011]; while slitting E21C 35/22)
   7/00  Methods or devices for drawing-off gases with or without subsequent use of the gas for any purpose
   9/00  Devices preventing sparking of machines or apparatus (preventing sparking of electric machines or apparatus H01K, H02K)
  11/00  Rescue devices or other safety devices, e.g. safety chambers or escape ways (breathing aids for curative purposes A61H 31/00; respiratory apparatus A62B 7/00; breathing apparatus for accidentally buried persons A62B 33/00)
  13/00  Transport specially adapted to underground conditions (mine cars B61D; transport in general, loading {unless specially adapted to underground conditions} B65G)
  13/002  .  .  [Crushing devices specifically for conveying in mines]
  13/004  .  .  [Staff transport system]
  13/006  .  .  [Equipment transport systems]
  13/008  .  .  [for mine roof support units for step-by-step movement]
  13/02  .  .  [Transport of mined mineral] in galleries
  13/025  .  .  [Shuttle cars]
Safety devices; Rescue devices

13/04 . . . . [Transport of mined material] in gravity inclines; in staple or inclined shafts

13/042 . . . . [Vertical hydraulic conveying of coal (conveying by water flow in general B65G 53/00)]

13/045 . . . . [Bunkers specially adapted for mining purposes (chutes in general B65G 11/00)]

13/047 . . . . [comprising helically running channels (chutes of helical form in general B65G 11/06)]

13/06 . . . . [Transport of mined material] at or adjacent to the working face

13/061 . . . . [Chutes and braking conveyors for average and steep slopes, adapted for mining purposes (chutes in general B65G 11/00)]

13/063 . . . . [Loading devices for use in mining]

13/065 . . . . [Scrapers (digging devices guided by cables E02F 3/54; combined with planing means E21C 27/42)]

13/066 . . . . [Scraper chain conveyors (in general B65G 19/00)]

13/068 . . . . [Special adaptations for use at the junction of the working face with the gallery, e.g. driving stations coupled to the driving station of the winning machine]

13/08 . . . . Shifting conveyors or other transport devices from one location at the working face to another (guiding mining machines along conveyors for the cut mineral E21C 35/12; in combination with mine roof supports for step-by-step movement E21D 23/00)

13/083 . . . . [Conveyor belts removing methods or devices]

13/086 . . . . [Armoured conveyed shifting devices]

13/10 . . . . Anchorings for conveyors

15/00 Methods or devices for placing filling-up materials in underground workings (dams E21F 17/103 ; chocks made of flexible containers filled with backfilling material E21D 15/483)

15/005 . . . . [characterised by the kind or composition of the backfilling material]

15/02 . . . . Supporting means, e.g. shuttering, for filling-up materials

15/04 . . . . Stowing mats; Goaf wire netting; Partition walls

15/06 . . . . Filling-up mechanically

15/08 . . . . Filling-up hydraulically or pneumatically (hydraulic or pneumatic transport devices B65G; pipes, pipe couplings F16L)

15/10 . . . . Hydraulic or pneumatic filling-up machines

16/00 Drainage (keeping dry foundation sites or other areas in the ground F02D 19/00)

16/02 . . . . of tunnels

17/00 Methods or devices for use in mines or tunnels, not covered elsewhere (mine lighting F21, H05B)

17/02 . . . . Suspension devices for tubes or the like, e.g. for ventilating ducts (supporting pipes, cables or protective tubing in general F16L 300 - F16L 700)

17/04 . . . . Distributing means for power supply in mines

17/06 . . . . Distributing electric power; Cable networks; Conduits for cables (circuit arrangements for supplying or distributing electric power in general H02J)

17/08 . . . . Distributing hydraulic power; Pipe networks for hydraulic liquid (pipe-line systems in general E17D)

17/10 . . . . Distributing pneumatic power; Pipe networks for compressed air (pipe-line systems in general F17D)

17/103 . . . . Dams, e.g. for ventilation

17/107 . . . . inflatable

17/12 . . . . Dam doors (air doors E21F 1/10; air locks E21F 1/1451)

17/16 . . . . Modification of mine passages or chambers for storage purposes, especially for liquids or gases (storing fluids in natural or artificial cavities or chambers in the earth B65G 5/00)

17/18 . . . . Special adaptations of signalling or alarm devices (for mine lifts B66B; gas-sensitive devices per se G01N)

17/185 . . . . [Rock-pressure control devices with or without alarm devices; Alarm devices in case of roof subsidence (props with load-measuring devices E21D 15/46)