

**CPC****COOPERATIVE PATENT CLASSIFICATION****E21F****SAFETY DEVICES, TRANSPORT, FILLING-UP, RESCUE, VENTILATION, OR DRAINING IN OR OF MINES OR TUNNELS****Guidance heading:** Ventilation of mines or tunnels**E21F 1/00** Ventilation of mines or tunnels; Distribution of ventilating currents (ventilating rooms or spaces in general [F24F](#) )E21F 1/003 . {Ventilation of traffic tunnels (during construction [E21F 1/04](#) to [E21F 3/00](#)) }

E21F 1/006 . {Ventilation at the working face of galleries or tunnels }

E21F 1/02 . Test models (analogue computers therefor [G06G 7/50](#))E21F 1/04 . Air ducts (suspension devices [E21F 17/02](#))E21F 1/06 . . Duct connections (tube connections in general [F16L](#) )E21F 1/08 . Ventilation arrangements in connection with air ducts, e.g. arrangements for mounting ventilators ( {[E21F 1/003](#) takes precedence } ; ventilators in general [F04D](#) )

E21F 1/085 . . {using compressed gas injectors }

E21F 1/10 . Air doors ( {[E21F 1/003](#) takes precedence ; air locks [E21F 1/145](#) ; dam doors [E21F 17/12](#) } ; doors in general [E06B](#) )

E21F 1/12 . . Devices for automatically opening air doors

E21F 1/14 . Air partitions; Air locks ( {[E21F 1/003](#) takes precedence } ; dams [E21F 17/103](#) ; air locks for foundations [E02D](#) )E21F 1/145 . . {Air locks (air doors [E21F 1/10](#) ; dam doors [E21F 17/12](#)) }

E21F 1/16 . Shaft covers

E21F 1/18 . Gravity flow ventilation ([E21F 1/02](#) to [E21F 1/16](#) take precedence)**E21F 3/00** Cooling or drying of air (air-conditioning rooms or spaces in general [F24F](#) )**Guidance heading:** Safety devices (flue-gas indicators [G01N](#) ) ; Rescue devices**E21F 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](#) )

E21F 5/02 . by wetting or spraying

E21F 5/04 . . Spraying barriers (spray nipples, spraying in general [B05B](#) , [B05D](#) ; picks with arrangements of fluid-spraying nozzles [E21C 35/187](#))

- E21F 5/06 . . Fluids used for spraying
- E21F 5/08 . Rock dusting of mines; Depositing other protective substances
- E21F 5/10 . . Devices for rock dusting
- E21F 5/12 . . Composition of rock dust
- E21F 5/14 . Fluid barriers or rock dusters made to work by, or at the same time as, shots or explosions
- E21F 5/143 . . {Fluid barriers }
- E21F 5/146 . . {Rock dusters }
- E21F 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](#))
- E21F 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](#)) }
- E21F 5/20 . Drawing-off or depositing dust ([dust-removing while drilling E21C 7/00](#); while slitting [E21C 35/22](#))
- E21F 7/00** **Methods or devices for drawing- off gases with or without subsequent use of the gas for any purpose**
- E21F 9/00** **Devices preventing sparking of machines or apparatus** ([preventing sparking of electric machines or apparatus H01K , H02K](#) )
- E21F 11/00** **Rescue devices or other safety devices, e.g. safety chambers, escape ways** ([respiratory apparatus A62B 7/00](#); [revival apparatus A62B 33/00](#); [breathing aids for curative purposes A61H 31/00](#))
- E21F 13/00** **Transport specially adapted to underground conditions** ([mine cars B61D](#) ; [transport in general, loading {unless specially adapted to underground conditions } B65G](#) )
- E21F 13/002 . {Crushing devices specifically for conveying in mines }
- E21F 13/004 . {Staff transport system }
- E21F 13/006 . {Equipment transport systems }
- E21F 13/008 . . {for mine roof support units for step-by-step movement }
- E21F 13/02 . {Transport of mined mineral } in galleries
- E21F 13/025 . . {Shuttle cars }
- E21F 13/04 . {Transport of mined material } in gravity inclines; in staple or inclined shafts
- E21F 13/042 . . {Vertical hydraulic conveying of coal ([conveying by water flow in general B65G 53/00](#)) }
- E21F 13/045 . . {Bunkers specially adapted for mining purposes ([chutes in general B65G 11/00](#)) }

- E21F 13/047 . . {comprising helically running channels (chutes of helical form in general [B65G 11/06](#)) }
- E21F 13/06 . {Transport of mined material } at or adjacent to the working face
- E21F 13/061 . . {Chutes and braking conveyers for average and steep slopes, adapted for mining purposes (chutes in general [B65G 11/00](#)) }
- E21F 13/063 . . { Loading devices for use in mining }
- E21F 13/065 . . . {Scrapers (digging devices guided by cables [E02F 3/54](#); combined with planing means [E21C 27/42](#)) }
- E21F 13/066 . . {Scraper chain conveyers (in general [B65G 19/00](#)) }
- E21F 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 }
- E21F 13/08 . Shifting conveyers or other transport devices from one location at the working face to another (guiding mining machines along conveyers for the cut mineral [E21C 35/12](#); in combination with mine roof supports for step-by-step movement [E21D 23/00](#))
- E21F 13/083 . . {Conveyer belts removing methods or devices }
- E21F 13/086 . . {Armoured conveyers shifting devices }
- E21F 13/10 . Anchorings for conveyers
- E21F 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](#) })**
- E21F 15/005 . {characterised by the kind or composition of the backfilling material }
- E21F 15/02 . Supporting means, e.g. shuttering, for filling-up materials
- E21F 15/04 . . Stowing mats; Goaf wire netting; Partition walls
- E21F 15/06 . Filling-up mechanically
- E21F 15/08 . Filling-up hydraulically or pneumatically (hydraulic or pneumatic transport devices [B65G](#) ; pipes, pipe couplings [F16L](#) )
- E21F 15/10 . . Hydraulic or pneumatic filling-up machines
- E21F 16/00** **Drainage (keeping dry foundation sites or other areas in the ground [E02D 19/00](#))**
- E21F 16/02 . of tunnels
- E21F 17/00** **Methods or devices for use in mines or tunnels, not covered elsewhere (mine lighting [F21](#) , [H05B](#) )**
- E21F 17/02 . Suspension devices for tubes or the like, e.g. for ventilating ducts (supporting pipes, cables or protective tubing in general [F16L 3/00](#) to [F16L 7/00](#))
- E21F 17/04 . Distributing means for power supply in mines
- E21F 17/06 . . Distributing electric power; Cable networks; Conduits for cables (circuit arrangements for supplying or distributing electric power in general [H02J](#) )

- E21F 17/08 . . Distributing hydraulic power; Pipe networks for hydraulic liquid ([pipe-line systems in general F17D](#) )
- E21F 17/10 . . Distributing pneumatic power; Pipe networks for compressed air ([pipe-line systems in general F17D](#) )
- E21F 17/103 . Dams, e.g. for ventilation
- E21F 17/107 . . inflatable
- E21F 17/12 . . Dam doors { ([air doors E21F 1/10](#); [air locks E21F 1/145](#)) }
- E21F 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](#))
- E21F 17/18 . Special adaptations of signalling or alarm devices ([for mine lifts B66B](#) ; [gas-sensitive devices per se G01N](#) )
- E21F 17/185 . . {[Rock-pressure control devices with or without alarm devices](#); [Alarm devices in case of roof subsidence \(props with load-measuring devices E21D 15/46\)](#) }