

E21F

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

Definition statement

This subclass/group covers:

Auxiliary machines and methods specifically adapted for use in underground mines or in tunnels.

References relevant to classification in this subclass

This subclass/group does not cover:

Machines for cutting, slitting or dislodging	E21C
Tunnel excavating machines	E21D 9/00

E21F 1/00

Ventilation of mines or tunnels; Distribution of ventilating currents (ventilating rooms or spaces in general F24F)

Definition statement

This subclass/group covers:

Ventilation of mines or tunnels.

Distribution of ventilating currents.

References relevant to classification in this group

This subclass/group does not cover:

Ventilating rooms or spaces in general	F24F
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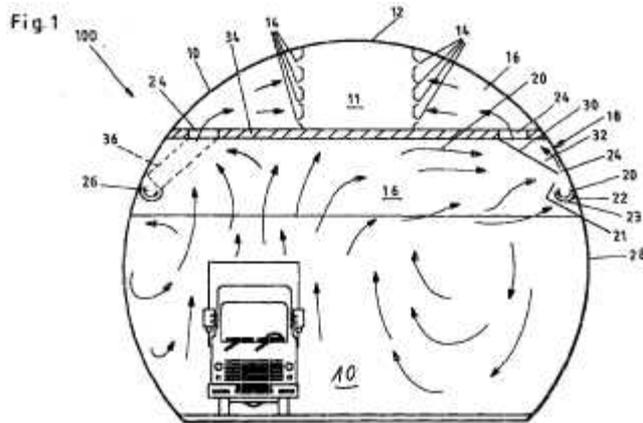
E21F 1/003

[N: Ventilation of traffic tunnels (during construction E21F1/04 to E21F3/00)]

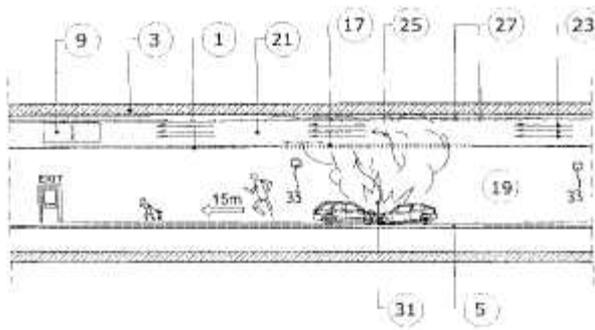
Definition statement

This subclass/group covers:

Specific modes of longitudinal or transversal flow to ensure the renewal of fresh air inside the tunnel:



Evacuation of fumes caused by a fire:



References relevant to classification in this group

This subclass/group does not cover:

Details of air ducts	E21F 1/04
Ventilators	E21F 1/08
Ventilation of traffic tunnels during construction	E21F 1/04 - E21F 3/00

Informative references

Attention is drawn to the following places, which may be of interest for search:

Preventing escape of fumes using a central system	B08B 15/002
Railway tunnels	B61B 13/10

Railway stations	B61B 1/00
Means permanently installed along the road for removing or neutralising exhaust gases	E01C 1/005

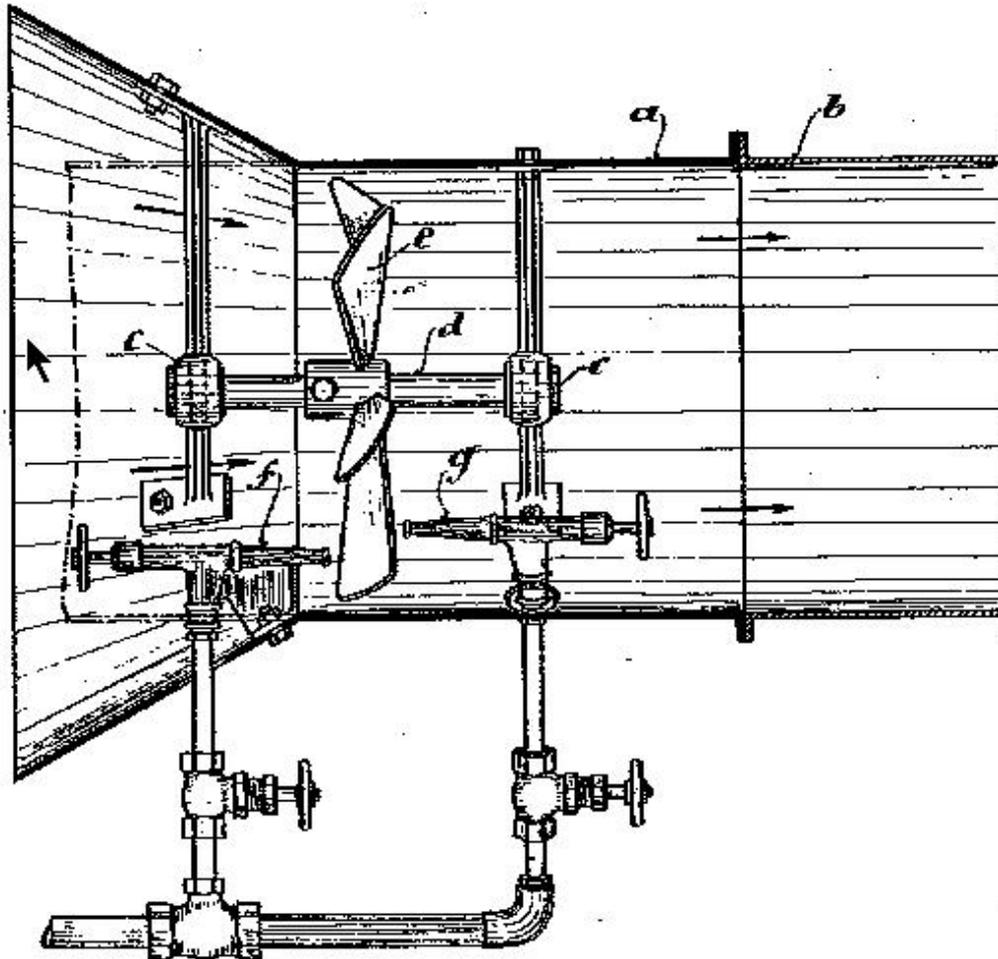
E21F 1/08

Ventilation arrangements in connection with air ducts, e.g. arrangements for mounting ventilators ([N: E21F1/003 takes precedence]; ventilators in general F04D)

Definition statement

This subclass/group covers:

- Construction of ventilating ducts when the type of ventilation is determined by the ducts themselves.
- Mounting of ventilators:



Informative references

Attention is drawn to the following places, which may be of interest for search:

Ventilators in general	F04D
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Special rules of classification within this group

If the ventilation is for traffic tunnels, then the document is classified in [E21F1/003](#)

E21F 1/10

Air doors ([N: E21F1/003 takes precedence; air locks E21F1/145; dam doors E21F17/12]; doors in general E06B)

Definition statement

This subclass/group covers:

Doors that can impede air circulation into a gallery, and can be opened when air circulation is necessary.

Safety doors for avoiding the extension of a fire or of smoke.

References relevant to classification in this group

This subclass/group does not cover:

Air locks	E21F 1/145
Dam doors	E21F 17/12

Informative references

Attention is drawn to the following places, which may be of interest for search:

Doors in general	E06B
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Special rules of classification within this group

If the ventilation is for traffic tunnels, then the document is classified in [E21F 1/003](#)

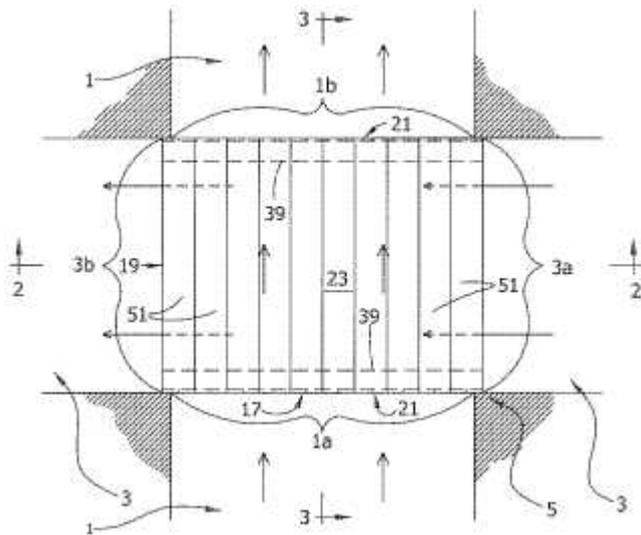
E21F 1/14

Air partitions; Air locks ([N: E21F1/003 takes precedence]; dams E21F17/103 ; air locks for foundations E02D)

Definition statement

This subclass/group covers:

Fixed or adjustable constructions to regulate the flow of air into a gallery or among multiple galleries:



References relevant to classification in this group

This subclass/group does not cover:

Dams	E21F 17/103
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Air locks for foundations	E02D
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Special rules of classification within this group

If the ventilation is for traffic tunnels, then the document is classified in [E21F 1/003](#)

E21F 1/16

Shaft covers

Definition statement

This subclass/group covers:
Covers for ventilation shafts.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Surface sealing of wellbores	E21B 33/02
Lining of shafts	E21D 5/00

E21F 3/00

Cooling or drying of air (air-conditioning rooms or spaces in general F24F)

Informative references

Attention is drawn to the following places, which may be of interest for search:

Air-conditioning rooms or spaces in general	F24F
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E21F 5/00

Means or methods for preventing, binding, depositing, or removing dust; [N: (in combination with mining machines E21C35/22)]; Preventing explosions or fires (dams E21F17/103 ; applying liquids or other fluent materials to surfaces in general B05)

Definition statement

This subclass/group covers:

Reduction of dust in a mining atmosphere. Any means that can help prevent a fire from starting or from spreading.

References relevant to classification in this group

This subclass/group does not cover:

Fire extinguishing equipment	A62C
Fire protection in buildings	E04B 1/94
Dust control in combination with mining machines	E21C 35/22

Informative references

Attention is drawn to the following places, which may be of interest for search:

Applying liquids or other fluent materials to surfaces in general	B05
Dams	E21F 17/103

E21F 5/08

Rock dusting of mines; Depositing other protective substances

Definition statement

This subclass/group covers:

Prevention of fires caused by ignition of coal dust and gas. A rock dust usually made of crushed limestone is sprayed to keep down the levels of coal dust.

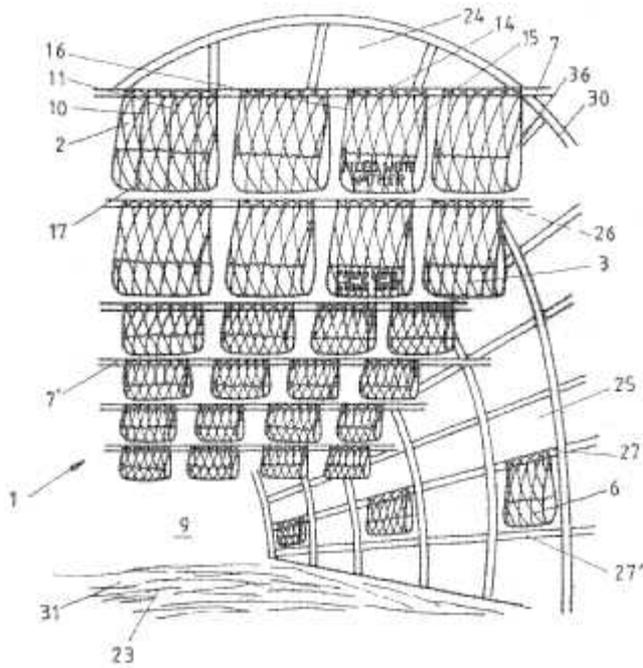
E21F 5/14

Fluid barriers or rock dusters made to work by, or at the same time as, shots or explosions

Definition statement

This subclass/group covers:

Constructions for confining explosions:



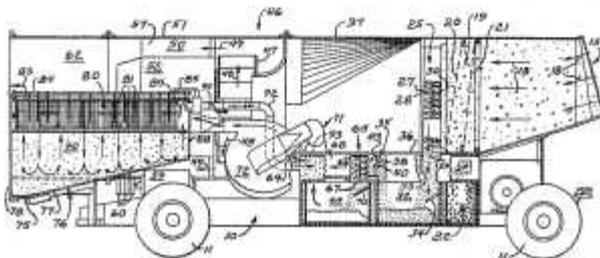
E21F 5/20

Drawing-off or depositing dust (dust-removing while drilling E21C7/00; while slitting E21C35/22)

Definition statement

This subclass/group covers:

Removal of dust from a mine atmosphere by using filters, cyclones or similar:



References relevant to classification in this group

This subclass/group does not cover:

Dust-removing while slitting in mining operations	E21C 35/22
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E21F 7/00

Methods or devices for drawing- off gases with or without subsequent use of the gas for any purpose

Definition statement

This subclass/group covers:

Removal of gases for safety purposes

References relevant to classification in this group

This subclass/group does not cover:

Production of coalbed methane	E21B 43/006
Gasification of coal underground	E21B 43/295

E21F 9/00

Devices preventing sparking of machines or apparatus (preventing sparking of electric machines or apparatus H01K, H02K)

Informative references

Attention is drawn to the following places, which may be of interest for search:

Preventing sparking of electric machines or apparatus	H01K , H02K
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E21F 11/00

Rescue devices or other safety devices, e.g. safety chambers, escape ways (respiratory apparatus A62B7/00; revival apparatus A62B33/00; breathing aids for curative purposes A61H31/00)

Definition statement

This subclass/group covers:

Systems and operations for protecting workers in an underground environment in case of accidents, for gaining access to the area of the accident, or for bringing the workers to surface or to a safe environment.

References relevant to classification in this group

This subclass/group does not cover:

Alarm devices	E21F 17/18
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Informative references

Attention is drawn to the following places, which may be of interest for search:

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 [N: unless specially adapted to underground conditions])

Definition statement

This subclass/group covers:

Transport of staff, equipment or extracted rocks or minerals in underground operations. The transport can be vertical, inclined or horizontal. It can be continuous by conveyors or discontinuous by shuttle cars.

This main groups and its subgroups also includes the constructive details of scraper chain conveyors for collecting the coal as it is cut in longwall operations.

References relevant to classification in this group

This subclass/group does not cover:

Removal and transport of material extracted during tunnel excavation	E21D 9/12
Transport in general, loading unless specially adapted to underground conditions	B65G

Informative references

Attention is drawn to the following places, which may be of interest for search:

Mine cars	B61D
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Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

Highwall mining	Method of mining by which a train typically formed by a continuous miner and multiple conveyers acting as pushbeams is propelled into a coal seam from the outside
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E21F 13/002

[N: Crushing devices specifically for conveying in mines]

Informative references

Attention is drawn to the following places, which may be of interest for search:

Crushing	B02C 4/00
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E21F 13/006

[N: Equipment transport systems]

References relevant to classification in this group

This subclass/group does not cover:

Transport of machines for slitting or completely freeing the mineral	E21C 33/00
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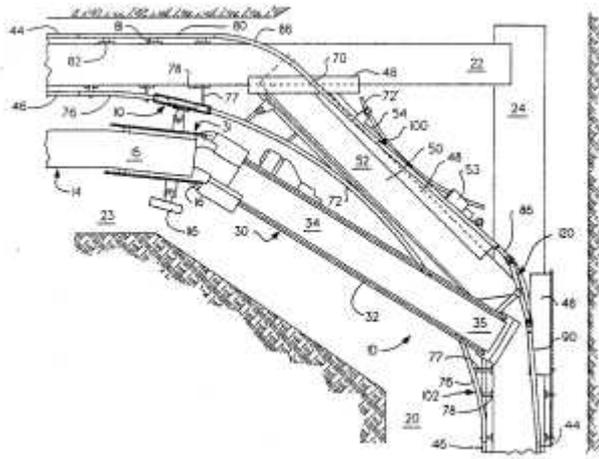
E21F 13/02

[N: Transport of mined mineral] in galleries

Definition statement

This subclass/group covers:

Means for transporting mined material to the surface or to some other point in the mine along one or more galleries:



References relevant to classification in this group

This subclass/group does not cover:

Gathering at the working face	E21F 13/06
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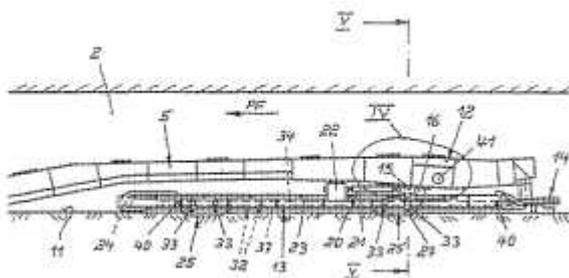
E21F 13/08

Shifting conveyers or other transport devices from one location at the working face to another (guiding mining machines along conveyers for the cut mineral E21C35/12; in combination with mine roof supports for step-by-step movement E21D23/00)

Definition statement

This subclass/group covers:

Apparatuses for moving conveyers along a gallery as the working faces advances. Self-propelled conveyers are also included:



References relevant to classification in this group

This subclass/group does not cover:

Guiding mining machines along conveyers for the cut mineral	E21C 35/12
Shifting conveyers in combination with mine roof supports for step-by-step movement	E21D 23/00

E21F 15/00

Methods or devices for placing filling-up materials in underground workings (dams E21F17/103; [N: chocks made of flexible containers filled with backfilling material E21D15/483])

Definition statement

This subclass/group covers:

Materials for filling up mine galleries and cavities. Machines for transporting and for placing the materials. Machines such as mixing bunkers for producing the filling-up materials that are adapted for use in an underground environment.

References relevant to classification in this group

This subclass/group does not cover:

Chocks made of flexible containers filled with backfilling material	E21D 15/483
Dams	E21F 17/103

Informative references

Attention is drawn to the following places, which may be of interest for search:

Hydraulic cements	C04B 28/02
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E21F 15/005

[N: characterised by the kind or composition of the backfilling material]

References relevant to classification in this group

This subclass/group does not cover:

A method or apparatus specific for use in mines must be disclosed in combination with the composition

Informative references

Attention is drawn to the following places, which may be of interest for search:

Compositions of mortars, concrete or artificail stone	C04B 28/00
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E21F 15/02

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

Informative references

Attention is drawn to the following places, which may be of interest for search:

Reinforcing elements for concrete cast in-situ for lining tunnels or galleries	E21D 11/107
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E21F 15/08

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

References relevant to classification in this group

This subclass/group does not cover:

Hydraulic or pneumatic transport devices	B65G
Pipes, pipe couplings	F16L

Special rules of classification within this group

This group includes mixing bunkers

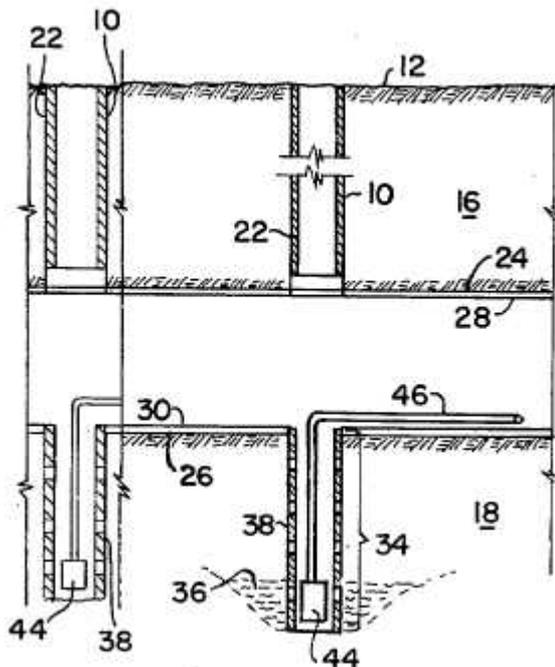
E21F 16/00

Drainage (keeping dry foundation sites or other areas in the ground E02D19/00)

Definition statement

This subclass/group covers:

Gathering of water surrounding a subterranean formation. Extraction of water to the outside:



References relevant to classification in this group

This subclass/group does not cover:

Keeping dry foundation sites or other areas in the ground	E02D 19/00
Waterproofing of tunnels	E21D 11/38

E21F 17/00

Methods or devices for use in mines or tunnels, not covered

elsewhere (mine lighting F21, H05B)

Definition statement

This subclass/group covers:

Methods or devices for use in mines or tunnels, not covered elsewhere

Informative references

Attention is drawn to the following places, which may be of interest for search:

Mine lighting	F21, H05B
Navigational instruments	G01C 21/00
Tracing profiles of cavities or tunnels	G01C 7/06
Control of position of vehicles	G05D 1/00
Radar systems	G01S 13/74

E21F 17/02

Suspension devices for tubes or the like, e.g. for ventilating ducts (supporting pipes, cables or protective tubing in general F16L3/00 to F16L7/00)

Informative references

Attention is drawn to the following places, which may be of interest for search:

Supporting pipes, cables or protective tubing in general	F16L 3/00 , F16L 7/00
Installation of cables in walls, ceilings or floors	H02G 3/26

E21F 17/103

Dams, e.g. for ventilation

Definition statement

This subclass/group covers:

Constructions for sealing off underground volumes, such as inactive galleries.

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 B65G5/00)

References relevant to classification in this group

This subclass/group does not cover:

Storing fluids in natural or artificial cavities or chambers in the earth	B65G 5/00
Excavation of large underground chambers	E21D 13/00