

B01F

MIXING, e.g. DISSOLVING, EMULSIFYING OR DISPERSING (mixing paints [B44D 3/06](#))

Definition statement

This place covers:

Agitation and/or homogenisation of products formed by a combination of two or more components with the purpose of obtaining a homogeneous composition or homogeneous conditions in the mass of material.

Stirring of a single material with the purpose of obtaining homogeneous conditions in the mass of material.

This subclass covers the mixing, agitation and homogenisation of materials, irrespective of the application in which it is produced, whenever the device and/or method is directed to achieve said desired effect.

References

Limiting references

This place does not cover:

Mixing paints	B44D 3/06
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Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Mixing apparatus; Roller mills for preparing chocolate	A23G 1/10
Apparatus or methods for producing mixtures of cement with other substances, e.g. slurries, mortars, porous or fibrous compositions	B28C 5/00
Controlling the operation of apparatus for producing mixtures of clay or cement with other substances; Supplying or proportioning the ingredients for mixing clay or cement with other substances; Discharging the mixture	B28C 7/00

Informative references

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

Disinfection, sterilisation or deodorisation of air	A61L 9/00
Granulation (with or without coating)	B01J 2/00
Chemical, physical or physico-chemical processes in general; Their relevant apparatus	B01J 19/00
Crushing, pulverising, disintegrating	B02
Flotation	B03D
Spraying apparatus; Atomising apparatus, e.g. aerosol manufacturing apparatus; Nozzles	B05B
Apparatus for applying fluent materials to surfaces, in general	B05C
Apparatus for enzymology or microbiology	C12M 1/00

Air-conditioning, air-humidification, ventilation	F24F
Drying	F26
Heat-exchange apparatus in which the heat-exchange media are contacted, e.g. cooling towers	F28C

Special rules of classification

In general, devices and processes in which agitation or contact of materials is produced, the object of said agitation/contact being different than for obtaining a homogeneous mixture (e.g. mass transfer devices and processes, a mere contact of two or more different materials, devices or processes in which agitation/homogenisation is intrinsic to the process per se but it is not the primary purpose), are not classified in this subclass.

As a general rule, the following information is to be classified in its whole extent:

What is mixed, i.e. the phases of materials being mixed: groups [B01F 21/00](#) and [B01F 23/00](#).

How it is mixed: groups [B01F 25/00](#), [B01F 27/00](#), [B01F 29/00](#), [B01F 31/00](#) and [B01F 33/00](#).

Auxiliary information: groups [B01F 35/00](#).

The use of substances used as emulsifying, wetting, dispersing or foam-producing agents is normally only classified in [C09K 23/00](#), except when the related devices for mixing are also disclosed.

With regard to the phases to be mixed, the following is to be observed:

- when only a general reference to the phases is indicated, only the indexing symbols [B01F 21/00](#) and [B01F 23/00](#) are used;
- if reference is made to the use of the device for any kind of mixtures, it is not classified in [B01F 21/00](#), [B01F 23/00](#), [B01F 21/00](#) or [B01F 23/00](#);
- when the application is of relevance (i.e. the type of product produced is claimed or the device is claimed for making a specific product) then it is also classified in the corresponding application field.

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Mixing	stirring of a single material
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B01F 23/21

by introducing liquids into gaseous media

References

Informative references

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

Dispensing two or more contents	B65D 83/68
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B01F 23/213**by spraying or atomising of the liquids****References*****Application-oriented references***

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Disinfection, sterilisation or deodorisation using sprayed or atomised substances	A61L 9/14
For internal combustion engines	F01N 3/00
Air-conditioned humidifier	F24F 6/00

Informative references

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

Evaporation by spraying	B01D 1/16
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B01F 23/23**by introducing gases into liquid media, e.g. for producing aerated liquids****Definition statement**

This place covers:

Mixing by introducing the gas into the liquid media using a particular technique, e.g. to obtain a homogenised mixture including appropriate bubble sizes or to produce aerated fluids.

B01F 23/232**using flow-mixing means for introducing the gases, e.g. baffles****References*****Informative references***

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

Distillation or related exchange processes in which liquids are contacted with gaseous media	B01D 3/00
Jet regulators with aerating means	E03C 1/084

B01F 23/234**Surface aerating****References*****Application-oriented references***

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Aeration of stretches of water	C02F 7/00
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B01F 23/235**for making foam****References*****Application-oriented references***

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

For fire extinguishing materials	A62C 5/02
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B01F 23/236**specially adapted for aerating or carbonating beverages****References*****Application-oriented references***

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Mixing gases with non-alcoholic beverages	A23L 2/54
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Informative references

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

Effervescence-generating compositions used in mixing non-alcoholic beverages, e.g. carbon dioxide tablets	A23L 2/40
Beer; Preparation of beer	C12C
Impregnation of wine with carbon dioxide; Preparation of sparkling wine	C12G 1/06
Preparation of other alcoholic beverages	C12G 3/00

B01F 23/2361**within small containers, e.g. within bottles****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Filling containers with liquids or semi-liquids using counterpressure by preliminary filling with inert gases, e.g. carbon dioxide	B67C 3/10
Apparatus utilising compressed air or other gas acting directly or indirectly on beverages in storage containers	B67D 1/04

B01F 23/41**Emulsifying****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Emulsion cosmetics or similar toilet preparations	A61K 8/06
Emulsified medicinal preparations	A61K 9/107
Use of substances as emulsifying, wetting, dispersing or foam-producing agents, e.g. emulsifiers	C09K 23/00

B01F 23/47**involving high-viscosity liquids, e.g. asphalt****Glossary of terms***In this place, the following terms or expressions are used with the meaning indicated:*

High viscosity liquids	A high viscosity fluid is generally considered one with a viscosity above 2000 centipoise, such as the viscosity of bitumen measured at 25 deg.C.
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B01F 23/60**Mixing solids with solids****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

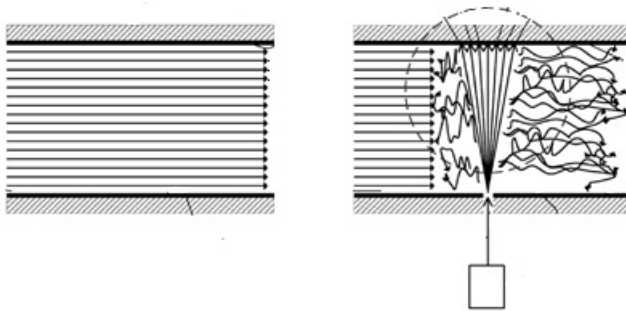
Obtaining an average product from stored bulk material in connection with loading or unloading	B65G 69/10
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B01F 25/27**Mixing by jetting components into a conduit for agitating its contents****Definition statement**

This place covers:

Mixing whereby the high-speed jetting components form a fluid stream which is used to agitate the contents flowing in a conduit, e.g. by directing the jet flow against each other.

Illustrative example of subject matter classified in this place:

**B01F 25/30****Injector mixers (mixing by creating vortex flow [B01F 25/10](#))****Definition statement**

This place covers:

Mixers wherein additional components are injected to a flowing main component without jetting the additional component.

References**Limiting references**

This place does not cover:

Mixing by creating a vortex flow, e.g. by tangential introduction of flow components	B01F 25/10
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B01F 25/31**in conduits or tubes through which the main component flows****References****Application-oriented references**

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Mixing devices for gas burners	F23D 14/62
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B01F 25/40

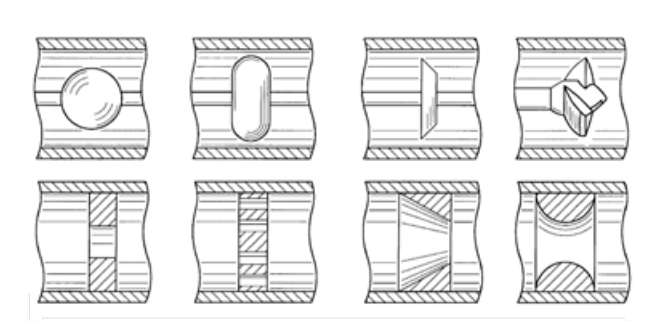
Static mixers (colloid-mills [B02C](#); mixing valves [F16K 11/00](#))

Definition statement

This place covers:

Mixers for the continuous mixing of material without moving components and is either by a change of direction of the flow or by splitting and recombining of the stream.

Illustrative examples of subject matter classified in this place:



References

Limiting references

This place does not cover:

Crushing, pulverizing or disintegrating, e.g. colloid mills	B02C
Multiple-way valves, e.g. mixing valves; Pipe fittings incorporating such valves; Arrangement of valves and flow lines specially adapted for mixing fluid	F16K 11/00

Informative references

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

Pump mixers of the centrifugal-pump type, i.e. turbo-mixers	B01F 25/64
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B01F 25/44

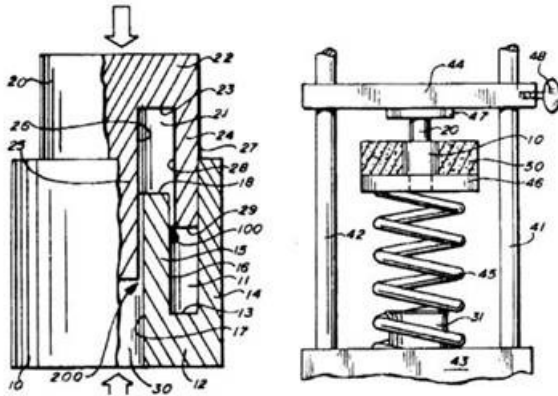
Mixers in which the components are pressed through slits

Definition statement

This place covers:

Mixers in which the pressing of the material through the orifices or interstitial spaces causes shear forces to mix the components.

Illustrative example of subject matter classified in this place:



B01F 25/60

Pump mixers, i.e. mixing within a pump

References

Informative references

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

Pumps for liquids or elastic fluids; Positive displacement machines for liquids	F04
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B01F 25/85

wherein the particles fall onto a film that flows along the inner wall of a mixer

Definition statement

This place covers:

Falling particle mixers whereby the particles are dropped on a flowing film of liquid which is created on the wall of a receptacle, e.g. to mix or avoid particles sticking to the wall.

B01F 27/00

Mixers with rotary stirring devices in fixed receptacles (magnetic mixers [B01F 33/45](#)); Kneaders

References

Limiting references

This place does not cover:

Magnetic mixers	B01F 33/45
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Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Mixing; Kneading of plastics	B29B 7/00
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Informative references

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

Crushing, pulverizing or disintegrating in general; Milling grain	B02C
Centrifugal mixers	B04B
Machines or devices specially designed for dressing or handling the mould material by grinding, blending, mixing, kneading or stirring	B22C 5/04
Multiple way valves, e.g. mixing valves; Pipe fittings incorporating such valves; Arrangement of valves and flow lines specially adapted for mixing fluid	F16K 11/00

B01F 27/054

Deformable stirrers, e.g. deformed by a centrifugal force applied during operation

References**Informative references**

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

Stirrers having elements for co-operating with receptacle wall or bottom, e.g. for scraping the receptacle wall	B01F 27/091
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B01F 27/072

characterised by the disposition of the stirrers with respect to the rotating axis

Definition statement

This place covers:

Stirrers or stirring elements mounted to the shaft and their arrangement or position in relation to the rotating axis of the main shaft of the stirrer, e.g. oblique, parallel, perpendicular, directly mounted on the shaft or mounted on a rod connected to the shaft.

B01F 27/09

characterised by the mounting of the stirrers with respect to the receptacle

Definition statement

This place covers:

Mounting of stirrers and their arrangement or position with regard to the receptacle.

B01F 27/091

with elements co-operating with receptacle wall or bottom, e.g. for scraping the receptacle wall

References**Informative references**

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

Pan-type mixers, i.e. mixers in which the stirring elements move along the bottom of a pan-shaped receptacle	B01F 27/82
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B01F 27/213

characterised by the connection with the drive

References**Informative references**

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

Couplings for transmitting rotation	F16D
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B01F 27/231

with a variable orientation during mixing operation, e.g. with tiltable rotor axis

Definition statement

This place covers:

Stirrers with a rotating axis which is movable during the mixing operation, e.g. to reach different areas of the mixing receptacle. The orientation of the fixed stirrer can be changed.

References**Informative references**

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

The stirrers rotating about a substantially vertical axis being additionally moved radially, or oscillating about an axis perpendicular to the stirrer axis	B01F 27/83
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B01F 27/723**the helices intermeshing to knead the mixture****References****Application-oriented references**

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

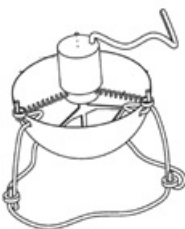
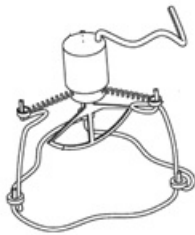
Mixing or kneading of plastics with intermeshing devices, e.g. intermeshing screws	B29B 7/48
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B01F 27/83**the stirrers being additionally moved radially, or oscillating about an axis perpendicular to the stirrer axis****Definition statement**

This place covers:

The stirrer oscillates about a horizontal axis due to the way the stirrer is connected to the mixer, e.g. by springs.

Illustrative example of subject matter classified in this place:

**References****Informative references**

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

With a variable orientation of the rotor axis during mixing operation, e.g. with tiltable rotor axis	B01F 27/231
With stirrers rotating about a substantially vertical axis and having planetary motion, i.e. rotating about their own axis and about sun axis	B01F 27/95

B01F 27/88

with a separate receptacle-stirrer unit that is adapted to be coupled to a drive mechanism

Definition statement

This place covers:

Stirrers with a separate receptacle-stirrer unit, which can be connected to a drive, e.g. motor, when required.

B01F 29/00

Mixers with rotating receptacles

References**Informative references**

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

Mixers with a mixing receptacle rotating alternately in opposite directions	B01F 31/10
Safety arrangements	B01F 35/60

B01F 29/15

Use of centrifuges for mixing

References**Informative references**

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

Centrifuges per se	B04B
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B01F 29/32

**Containers specially adapted for coupling to rotating frames or the like;
Coupling means therefor**

Definition statement

This place covers:

Containers, e.g. separate tumblers or receptacles, which are specially adapted for coupling to the rotating frame of the mixer, e.g. by using an indentation on the container wall.

B01F 29/34

Constructional details of holders for the individual packages or containers

Definition statement

This place covers:

Package or container holders of the mixer which are shaped so as to hold the individual package or container.

B01F 29/60

rotating about a horizontal or inclined axis, e.g. drum mixers

References**Application-oriented references**

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Apparatus for tenderising meat, e.g. massaging ham by using tumblers or rotating drums	A22C 9/00
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B01F 29/63

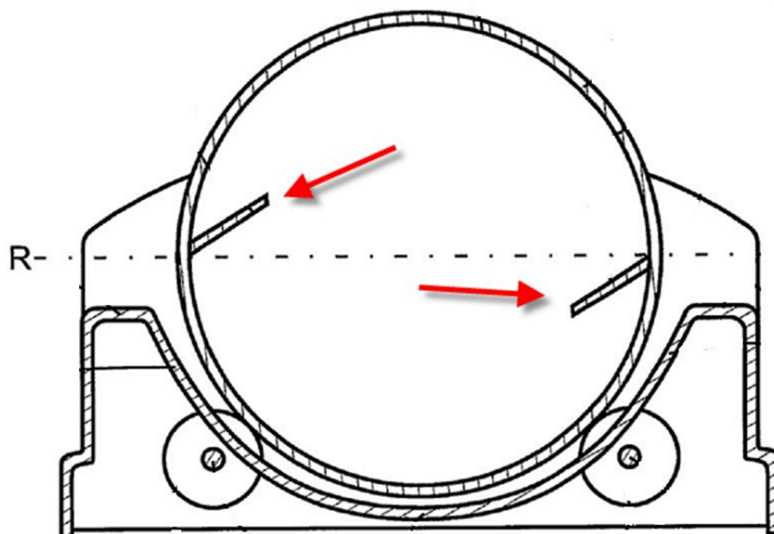
with fixed bars, i.e. stationary, or fixed on the receptacle

Definition statement

This place covers:

Mixers with stationary bars that are optionally fixed to the receptacle.

Illustrative example of subject matter classified in this place:



B01F 29/83

with rotary paddles or arms, e.g. movable out of the receptacle

References**Application-oriented references**

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Mixing or kneading machines for the preparation of dough with inclined rotating mixing arms or levers	A21C 1/04
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B01F 31/00

Mixers with shaking, oscillating, or vibrating mechanisms

References**Informative references**

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

Safety arrangements	B01F 35/60
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B01F 31/40

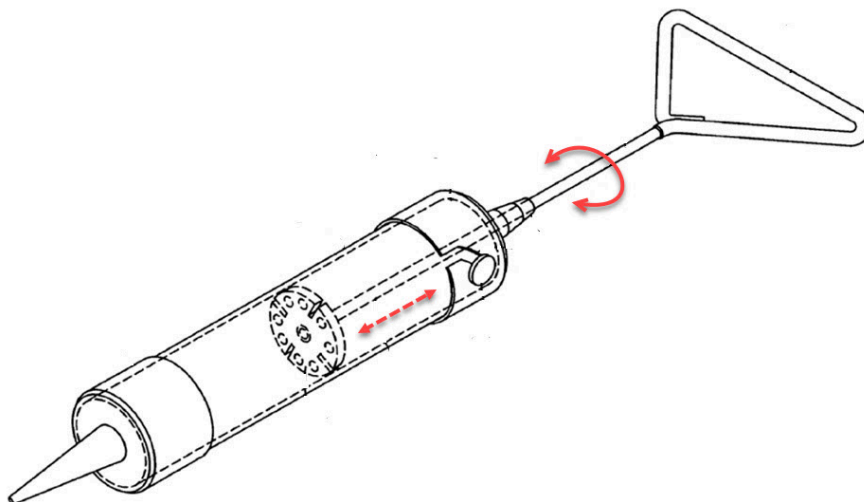
with an axially oscillating rotary stirrer

Definition statement

This place covers:

Mixers having a rotating stirrer whereby simultaneously an axial motion is imparted to the stirrer axis.

Illustrative example of subject matter classified in this place:



B01F 31/42

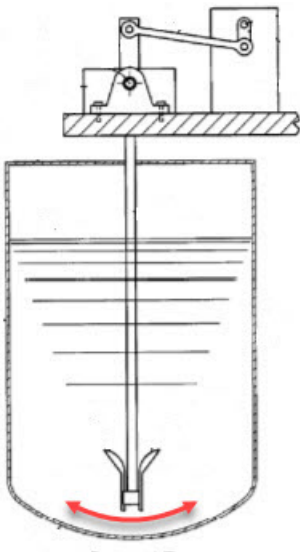
with pendulum stirrers, i.e. with stirrers suspended so as to oscillate about fixed points or axes

Definition statement

This place covers:

Mixers having a rotating stirrer whereby simultaneously a pendulum motion is imparted to the stirrer axis.

Illustrative example of subject matter classified in this place:



B01F 31/445

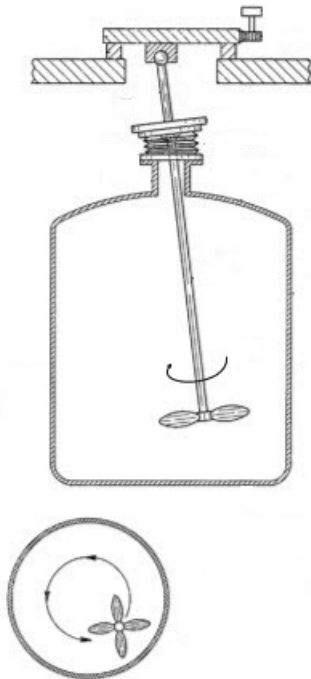
performing an oscillatory movement about an axis

Definition statement

This place covers:

Mixers having a rotating stirrer and at the same time an oscillatory movement is imparted to the stirrer axis about an axis.

Illustrative example of subject matter classified in this place:



B01F 33/00

Other mixers; Mixing plants; Combinations of mixers

References

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Mixing or kneading machines for the preparation of dough with rollers	A21C 1/08
Continuous mixing or kneading of plastics with mechanical mixing or kneading devices	B29B 7/30

Informative references

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

Crushing or disintegrating by roller mills	B02C 4/00
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B01F 33/12

Mixers in which the mixing of the components is achieved by natural convection

References

Informative references

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

Micromixers using heat to mix or move the fluids	B01F 33/3033
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B01F 33/30**Micromixers****Definition statement**

This place covers:

Mixers having transporting fluid channels with sizes in the micrometre range.

References**Application-oriented references**

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Processes or apparatus specially adapted for the manufacture or treatment of microstructural devices or systems	B81C
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Informative references

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

Microstructural devices or systems	B81B
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B01F 33/40**Mixers using gas or liquid agitation, e.g. with air supply tubes****References****Application-oriented references**

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Apparatus specially adapted for being mounted on vehicles with provision for mixing cement during transport	B28C 5/42
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Informative references

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

Jet mixers	B01F 25/20
Injector mixers	B01F 25/30
Aeration of stretches of water	C02F 7/00

B01F 33/501

Movable mixing devices, i.e. readily shifted or displaced from one place to another, e.g. portable during use

References**Application-oriented references**

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Machines for domestic use in mixing of food, not covered elsewhere, e.g. hand mixers used in kitchens	A47J 43/04
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B01F 33/502

Vehicle-mounted mixing devices

Definition statement

This place covers:

Vehicle mounted mixing devices which cannot be separated from the movable vehicle.

References**Application-oriented references**

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Apparatus specially adapted for being mounted on vehicles with provision for mixing cement during transport	B28C 5/42
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B01F 33/81

Combinations of similar mixers, e.g. with rotary stirring devices in two or more receptacles

Definition statement

This place covers:

Mixers where the material is in a type of mixer, e.g. static mixer, then the material is moved into another similar mixer.

B01F 33/83

Mixing plants specially adapted for mixing in combination with disintegrating operations

References**Informative references**

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

Crushing, pulverising or disintegrating in general	B02C
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B01F 33/85**Mixing plants with mixing receptacles or mixing tools that can be indexed into different working positions****Definition statement**

This place covers:

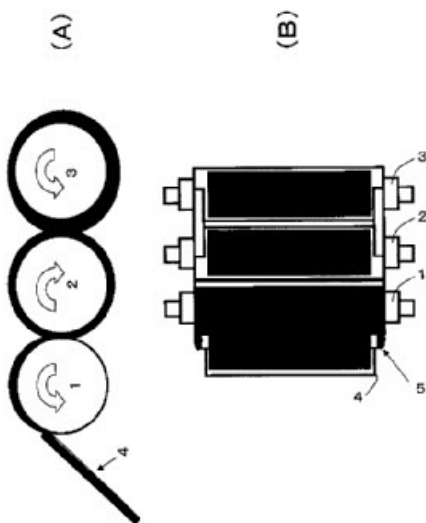
Mixing plants where the receptacles are capable of moving through the plant to a plurality of locations for performing different mixing operations.

B01F 33/87**Roll-type mixers****Definition statement**

This place covers:

Mixers having at least one roller rotating around its longitudinal axis, typically having at least two rollers pressing against each other to homogenize and mix a material.

Illustrative example of subject matter classified in this place:

**References****Application-oriented references**

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Mixing or kneading machines for the preparation of dough with rollers	A21C 1/08
Continuous mixing or kneading of plastics with rotary mixing or kneading devices	B29B 7/38

Informative references

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

Crushing or disintegrating by roller mills	B02C 4/00
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B01F 35/10**Maintenance of mixers****Definition statement**

This place covers:

Maintenance of mixers includes any process of preserving the proper functioning of the mixers, e.g. washing, cleaning, repairing or replacing of mixers.

References**Informative references**

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

Cleaning in general	B08B
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B01F 35/11**using fluids****Definition statement**

This place covers:

Maintenance of mixers by the application of fluids for maintenance purposes, e.g. using oil for lubrication of parts or using cleaning fluids for cleaning of mixers.

B01F 35/12**using mechanical means****Definition statement**

This place covers:

Maintenance of mixers by using mechanical means, e.g. knockers or scrapers to dislodge material that sticks to the surface of the mixer.

B01F 35/214**characterised by the means for measuring****References****Informative references**

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

Measuring; Testing	G01
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B01F 35/50**Mixing receptacles****Definition statement**

This place covers:

Receptacles specially adapted to mixing.

B01F 35/81**Forming mixtures with changing ratios or gradients****Definition statement**

This place covers:

The ratio or gradient of the amount or flow rates of two or more materials to be mixed are varied to obtain a collection of several mixtures of different concentrations.

B01F 35/83**by controlling the ratio of two or more flows, e.g. using flow sensing or flow controlling devices****Definition statement**

This place covers:

Controlling of the ratio of two or more flows of substances to be mixed whereby the operation is a continuous process.

B01F 35/88**by feeding the materials batchwise****Definition statement**

This place covers:

Feeding of the material to be mixed whereby the operation is done in batches.

B01F 2101/34**Mixing fuel and prill, i.e. water or other fluids mixed with solid explosives, to obtain liquid explosive fuel emulsions or slurries****Glossary of terms**

In this place, the following terms or expressions are used with the meaning indicated:

Prill	a small aggregate or globule of a material, typically a dry sphere, formed from a melted liquid
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