

# CPC COOPERATIVE PATENT CLASSIFICATION

## F MECHANICAL ENGINEERING; LIGHTING; HEATING; WEAPONS; BLASTING (NOTE omitted)

### LIGHTING; HEATING

#### F26 DRYING

**F26B DRYING SOLID MATERIALS OR OBJECTS BY REMOVING LIQUID THEREFROM** (racks for drying fruit and vegetables [A01F 25/12](#); drying foodstuffs [A23](#); drying hair [A45D 20/00](#); body-drying implements [A47K 10/00](#); drying household articles [A47L](#), {e.g. drying footwear [A47L 23/20](#); } drying gases and vapours [B01D](#); chemical and physical processes for dewatering or like separating liquids from solids [B01D 43/00](#); centrifugal apparatus [B04](#); drying ceramics [C04B 33/30](#); drying yarns and fabrics in association with some other form of treatment [D06C](#); drying frames for laundry without heating or positive air circulation, domestic and like spin-dryers, wringing and hot pressing laundry [D06F](#); furnaces, kilns, ovens [F27](#); {treatment including a drying step of semiconductor substrates, e.g. wafers, [H01L 21/67028](#)})

#### WARNINGS

- The following IPC groups are not in the CPC scheme. The subject matter for these IPC groups is classified in the following CPC groups:
 

|                            |            |   |
|----------------------------|------------|---|
| <a href="#">F26B 11/06</a> | covered by | <a href="#">F26B 11/0486</a>                            |
| <a href="#">F26B 13/02</a> | covered by | <a href="#">F26B 13/10</a>                              |
| <a href="#">F26B 13/04</a> | covered by | <a href="#">F26B 13/10</a>                              |
| <a href="#">F26B 13/20</a> | covered by | <a href="#">F26B 13/104</a>                             |
| <a href="#">F26B 23/08</a> | covered by | <a href="#">F26B 3/343</a> , <a href="#">F26B 3/347</a> |
- 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.

|  |        |  |
|--|--------|--|
| <b><u>Processes for drying</u></b>   | 3/082  | . . . . {arrangements of devices for distributing fluidising gas, e.g. grids, nozzles ( <a href="#">F26B 3/0926</a> takes precedence; such devices per se <a href="#">B01J 8/44</a> )} |
| <b>1/00 Preliminary treatment of solid materials or objects to facilitate drying {, e.g. mixing or backmixing the materials to be dried with predominantly dry solids (<a href="#">F26B 5/005</a> takes precedence)}</b>     | 3/084  | . . . . with heat exchange taking place in the fluidised bed {, e.g. combined direct and indirect heat exchange}   |
| <b>1/005</b> . {by means of disintegrating, e.g. crushing, shredding, milling the materials to be dried ( <a href="#">F26B 17/102</a> , <a href="#">F26B 17/103</a> take precedence)}  | 3/088  | . . . . using inert thermally-stabilised particles   |
| <b>3/00 Drying solid materials or objects by processes involving the application of heat (in specific machines or apparatus <a href="#">F26B 9/00</a> - <a href="#">F26B 19/00</a>)</b>                                      | 3/092  | . . . . agitating the fluidised bed, e.g. by vibrating or pulsating  |
| <b>3/005</b> . {by applying a combustible liquid onto the materials, the liquid being burnt off subsequently}  | 3/0923 | . . . . {by mechanical means, e.g. vibrated plate, stirrer}  |
| <b>3/02</b> . by convection, i.e. heat being conveyed from a heat source to the materials or objects to be dried by a gas or vapour, e.g. air {( <a href="#">F26B 3/283</a> and <a href="#">F26B 3/343</a> take precedence)} | 3/0926 | . . . . {by pneumatic means, e.g. spouted beds}  |
| <b>3/04</b> . . the gas or vapour circulating over or surrounding the materials or objects to be dried ( <a href="#">F26B 3/14</a> takes precedence)   | 3/097  | . . . . using a magnetic field to stabilise the fluidised bed  |
| <b>3/06</b> . . the gas or vapour flowing through the materials or objects to be dried ( <a href="#">F26B 3/14</a> takes precedence)   | 3/10   | . . the gas or vapour carrying the materials or objects to be dried with it  |
| <b>3/08</b> . . . so as to loosen them, e.g. to form a fluidised bed {"fluidised-bed" technique in general <a href="#">B01J 8/24</a> ; centrifugal fluidised beds <a href="#">F26B 7/007</a> }                               | 3/12   | . . . in the form of a spray {, i.e. sprayed or dispersed emulsions or suspensions (spray drying of solutions <a href="#">B01D 1/18</a> )}   |
|  | 3/14   | . . the materials or objects to be dried being moved by gravity  |
|  | 3/16   | . . . in a counter-flow of the gas or vapour   |
|  | 3/18   | . by conduction, i.e. the heat is conveyed from the heat source, e.g. gas flame, to the materials or objects to be dried by direct contact   |

- 3/20 . . the heat source being a heated surface {, e.g. a moving belt or conveyor} ([F26B 3/22](#) takes precedence)
- 3/205 . . . {the materials to be dried covering or being mixed with heated inert particles which may be recycled}
- 3/22 . . the heat source and the materials or objects to be dried being in relative motion, e.g. of vibration
- 3/225 . . . {the materials or objects to be dried being immersed in a fluidised bed of heated particles (for webs [F26B 13/106](#))}
- 3/24 . . . the movement being rotation
- 3/26 . . . the movement being performed by gravity
- 3/28 . by radiation, e.g. from the sun
- 3/283 . . {in combination with convection}
- 3/286 . . . {by solar radiation}
- 3/30 . . from infrared-emitting elements {(by radiation emanating from passages containing heated fluids other than combustion gases [F26B 23/10](#))}
- 3/305 . . . {the infrared radiation being generated by combustion or combustion gases}
- 3/32 . by development of heat within the materials or objects to be dried {, e.g. by fermentation or other microbiological action}
- 3/34 . . by using electrical effects
- 3/343 . . . {in combination with convection}
- 3/347 . . . Electromagnetic heating, e.g. induction heating or heating using microwave energy
- 3/353 . . . Resistance heating {, e.g. using the materials or objects to be dried as an electrical resistance}
- 3/36 . . by using mechanical effects, e.g. by friction (by using ultrasonic vibrations [F26B 5/02](#))
- 5/00** **Drying solid materials or objects by processes not involving the application of heat** (separating liquids from solids by straining [B01D](#); replacing liquids in wet solids by other liquids, e.g. water by spirit, [B01D 12/00](#); drying by electrophoresis [B01J](#))
- 5/005 . {by dipping them into or mixing them with a chemical liquid, e.g. organic; chemical, e.g. organic, dewatering aids ([F26B 3/005](#) takes precedence; using chemical vapours or gases [F26B 21/14](#))}
- 5/02 . by using ultrasonic vibrations {(using sonic energy generated by pulse jet combustion [F26B 23/026](#))}
- 5/04 . by evaporation or sublimation of moisture under reduced pressure, e.g. in a vacuum {([F26B 11/049](#) and [F26B 17/128](#) take precedence)}
- NOTE**
- In subgroups [F26B 5/04](#) and [F26B 5/06](#), the term "not including the application of heat" is disregarded for classification purposes. When drying with the use of vacuum, frequently heat is applied to compensate for the cooling effect or to promote sublimation from the frozen state
- 5/041 . . {for drying flowable materials, e.g. suspensions, bulk goods, in a continuous operation, e.g. with locks or other air tight arrangements for charging/discharging}
- 5/042 . . {for drying articles or discrete batches of material in a continuous or semi-continuous operation, e.g. with locks or other air tight arrangements for charging/discharging}
- 5/044 . . {for drying materials in a batch operation in an enclosure having a plurality of shelves which may be heated ([F26B 5/045](#) takes precedence)}
- 5/045 . . {for drying thin, flat articles in a batch operation, e.g. leather, rugs, gels}
- 5/047 . . {for continuous drying of material in long length, e.g. webs}
- 5/048 . . {in combination with heat developed by electromagnetic means, e.g. microwave energy}
- 5/06 . . the process involving freezing
- 5/065 . . . {the product to be freeze-dried being sprayed, dispersed or pulverised}
- 5/08 . by centrifugal treatment
- 5/10 . . the process involving freezing
- 5/12 . by suction
- 5/14 . by applying pressure, e.g. wringing; by brushing; by wiping
- 5/16 . by contact with sorbent bodies, e.g. absorbent mould; by admixture with sorbent materials
- 7/00** **Drying solid materials or objects by processes using a combination of processes not covered by a single one of groups [F26B 3/00](#) and [F26B 5/00](#) {([F26B 1/005](#), [F26B 5/04](#), [F26B 23/026](#) take precedence)}**
- 7/002 . {using an electric field and heat}
- 7/005 . {using admixture with sorbent materials and heat, e.g. generated by the mixture}
- 7/007 . {centrifugal fluidised beds}
- Machines or apparatus for drying**
- 9/00** **Machines or apparatus for drying solid materials or objects at rest or with only local agitation; Domestic airing cupboards {(domestic laundry drying cabinets or chambers having heating or ventilating means [D06F 58/10](#))}**
- 9/003 . {Small self-contained devices, e.g. portable}
- 9/006 . {Removable covering devices, e.g. pliable or flexible}
- 9/02 . in buildings (special types of buildings [E04H](#))
- 9/04 . in presses or clamping devices
- 9/06 . in stationary drums or chambers
- 9/063 . . {for drying granular material in bulk, e.g. grain bins or silos with false floor (shallow layer rotary sweep drying bins [F26B 9/10](#); perforated wall silos with drying air channels in the stack [F26B 9/103](#))}
- 9/066 . . {the products to be dried being disposed on one or more containers, which may have at least partly gas-previous walls, e.g. trays or shelves in a stack ([F26B 9/003](#) takes precedence; in combination with duct systems [F26B 21/00](#))}
- 9/08 . . including agitating devices {, e.g. pneumatic recirculation arrangements (unloading devices [F26B 25/002](#); spouted beds [F26B 3/0926](#))}
- 9/082 . . . {mechanically agitating or recirculating the material being dried}
- 9/085 . . . . {moving the material in a substantially vertical sense using conveyors or agitators, e.g. screws or augers with vertical axis, which are positioned inside the drying enclosure}
- 9/087 . . . . {the recirculation path being positioned outside the drying enclosure}

- 9/10 . . . in the open air; in pans or tables in rooms; Drying stacks of loose material {on floors which may be covered, e.g. by a roof ([ventilating means of stacks for agricultural produce A01F 25/08](#))}
- 9/103 . . {using fixed or removable drying air channels placed in the stack, e.g. horizontally or vertically}
- 9/106 . . . {the channels to be inserted into the stack, e.g. after its formation}
- 11/00 Machines or apparatus for drying solid materials or objects with movement which is non-progressive**
- 11/02 . . in moving drums or other mainly-closed receptacles ([F26B 11/18 takes precedence](#))
- 11/022 . . {Arrangements of drives, bearings, supports}
- 11/024 . . {Arrangements for gas-sealing the drum}
- 11/026 . . {Arrangements for charging or discharging the materials to be dried, e.g. discharging by reversing drum rotation, using spiral-type inserts}
- 11/028 . . {Arrangements for the supply or exhaust of gaseous drying medium for direct heat transfer, e.g. perforated tubes, annular passages, burner arrangements, dust separation, combined direct and indirect heating}
- 11/04 . . rotating about a horizontal or slightly-inclined axis {([F26B 11/022](#), [F26B 11/024](#), [F26B 11/026](#), [F26B 11/028 take precedence](#))}
- 11/0404 . . . {with internal subdivision of the drum, e.g. for subdividing or recycling the material to be dried ([spiral-type or other inserts for discharging purposes F26B 11/026](#))}
- 11/0409 . . . . {the subdivision consisting of a plurality of substantially radially oriented internal walls, e.g. forming multiple sector-shaped chambers}
- 11/0413 . . . . {the subdivision consisting of concentric walls, e.g. multi-pass or recirculation systems; the subdivision consisting of spiral-shaped walls ([tubular or annular passages for supply or exhaust of drying gas F26B 11/028](#))}
- 11/0418 . . . . {the subdivision consisting of a plurality of parallel tubes, e.g. through which the material to be dried is conveyed in single or multi-pass fashion ([sector-shaped tubes F26B 11/0409](#))}
- 11/0422 . . . . . {the tubes having internal members}
- 11/0427 . . . . . {Constructional details, e.g. arrangements of drives, supports, bearings, gas-sealing, heating medium supply or exhaust}
- 11/0431 . . . . . {Arrangements for feeding or discharging materials to be dried}
- 11/0436 . . . {comprising multiple stages, e.g. multiple rotating drums subsequently receiving the material to be dried; Provisions for heat recuperation}
- 11/044 . . . {the drum or receptacle having a variable outer or inner diameter in axial direction, e.g. tronconical; the drum or receptacle having a polygonal or non-cylindrical shape ([F26B 11/0436](#), [F26B 11/049 take precedence](#))}
- 11/0445 . . . {having conductive heating arrangements, e.g. heated drum wall}
- 11/045 . . . . . {using heated internal elements, e.g. which move through or convey the materials to be dried ([loose bodies, e.g. balls F26B 11/0472](#))}
- 11/0454 . . . . . {the elements being discs}
- 11/0459 . . . . . {the elements being chains}
- 11/0463 . . . {having internal elements, e.g. which are being moved or rotated by means other than the rotating drum wall ([F26B 11/0404](#), [F26B 11/0445 take precedence](#))}
- 11/0468 . . . . . {for disintegrating, crushing, or for being mixed with the materials to be dried}
- 11/0472 . . . . . {the elements being loose bodies or materials, e.g. balls, which may have a sorbent effect ([chains fixed to the drum F26B 11/0459](#))}
- 11/0477 . . . . . {for mixing, stirring or conveying the materials to be dried, e.g. mounted to the wall, rotating with the drum}
- 11/0481 . . . . . {the elements having a screw- or auger-like shape, or form screw- or auger-like channels}
- 11/0486 . . . . . {the elements being held stationary, e.g. internal scraper blades}
- 11/049 . . . {with provisions for working under increased or reduced pressure, with or without heating}
- 11/0495 . . . {with provisions for drying by electro-magnetic means, e.g. radiation, microwaves ([burner arrangements F26B 11/028](#))}
- 11/08 . . rotating about a vertical or steeply-inclined axis
- 11/10 . . . with stirring devices which are held stationary
- 11/12 . . in stationary drums or other mainly-closed receptacles with moving stirring devices ([F26B 11/22 takes precedence](#))
- 11/14 . . the stirring device moving in a horizontal or slightly-inclined plane
- 11/16 . . the stirring device moving in a vertical or steeply-inclined plane
- 11/18 . . on or in moving dishes, trays, pans, or other mainly-open receptacles
- 11/181 . . {the receptacle being a foraminous, perforated or open-structured drum or drum-like container, e.g. rotating around a substantially horizontal or vertical axis; the receptacle being multiple perforated drums, e.g. in superimposed arrangement}
- 11/182 . . . {Arrangements for the supply or exhaust of gaseous drying medium, e.g. perforated tubes ([F26B 11/185 takes precedence](#))}
- 11/184 . . . {provided with internal means for mixing, stirring or conveying the materials to be dried ([F26B 11/182](#), [F26B 11/185 take precedence](#))}
- 11/185 . . . {the drum provided with internal subdivisions or multiple walls}
- 11/187 . . . . . {the subdivisions consisting of sector-shaped perforated chambers}
- 11/188 . . . . . {the subdivisions consisting of concentric perforated walls, or spiral-shaped walls}
- 11/20 . . with stirring devices which are held stationary
- 11/22 . . on or in stationary dishes, trays, pans, or other mainly-open receptacles, with moving stirring devices

- 13/00 Machines and apparatus for drying fabrics, fibres, yarns, or other materials in long lengths, with progressive movement**
- 13/001 . {Drying and oxidising yarns, ribbons or the like}
  - 13/002 . . {Drying coated, e.g. enamelled, varnished, wires}
  - 13/003 . . {in the shape of spools, coils, bobbins or the like (F26B 21/007 takes precedence; drying yarn hanks F26B 15/124)}
  - 13/004 . {Drying ribbons}
  - 13/005 . {Seals, locks, e.g. gas barriers for web drying enclosures}
  - 13/006 . {with movement in a spiral path}
  - 13/007 . {Treating a particular portion of the web or plate, e.g. the edge}
  - 13/008 . {Controlling the moisture profile across the width of the material}
  - 13/06 . with movement in a sinuous or zig-zag path
  - 13/08 . . using rollers
  - 13/10 . Arrangements for feeding, heating or supporting materials; Controlling movement, tension or position of materials (heating processes F26B 3/00)
  - 13/101 . . {Supporting materials without tension, e.g. on or between foraminous belts}
  - 13/102 . . . {the materials, e.g. web, being supported in loops by rods or poles, which may be moving transversely, e.g. festoon dryers}
  - 13/103 . . . {with mechanical supporting means, e.g. belts, rollers, and fluid impingement arrangement having a displacing effect on the materials}
  - 13/104 . . . {supported by fluid jets only; Fluid blowing arrangements for flotation dryers, e.g. coanda nozzles}
  - 13/105 . . {Drying webs by contact with heated surfaces other than rollers or drums}
  - 13/106 . . . {by moving them through a fluidised bed of heated particles}
  - 13/107 . . {Arrangements for guiding the feed end or trailing end of the materials, e.g. threading of webs}
  - 13/108 . . {using one or more blowing devices, e.g. nozzle bar, the effective area of which is adjustable to the width of the material}
  - 13/12 . . Controlling movement, tension or position of material
  - 13/14 . . Rollers, {drums, cylinders}(sorbent surfaces F26B 13/26); {Arrangement of drives, supports, bearings, cleaning}
  - 13/145 . . . {on the non-perforated outside surface of which the material is being dried by convection or radiation}
  - 13/16 . . . perforated {in combination with hot air blowing or suction devices, e.g. sieve drum dryers}(F26B 13/18 takes precedence)
  - 13/18 . . . heated {or} cooled, {e.g. from inside, the material being dried on the outside surface by conduction}
  - 13/183 . . . . {Arrangements for heating, cooling, condensate removal}
  - 13/186 . . . . {using combustion}
  - 13/22 . . Arrangements of gas flames
  - 13/24 . Arrangements of devices using drying processes not involving heating (such processes per se F26B 5/00)
  - 13/26 . . using sorbent surfaces, e.g. bands or coverings on rollers
- 13/28 . . for applying pressure; for brushing; for wiping
- 13/30 . . for applying suction (F26B 13/16 takes precedence)}
- 15/00 Machines or apparatus for drying objects with progressive movement; Machines or apparatus with progressive movement for drying batches of material in compact form (F26B 13/00, F26B 17/00 take precedence; conveyors in general B65G)**
- 2015/003 . {the load carrying elements having provisions for defining drying gas ducts, e.g. panels}
  - 2015/006 . {the drying tunnel not being partitioned by load carrying elements}
  - 15/02 . with movement in the whole or part of a circle
  - 15/04 . . in a horizontal plane
  - 15/06 . . . involving several planes, one above the other
  - 15/08 . . in a vertical plane
  - 15/085 . . . {with endless clamp or tray conveyor, e.g. wicket conveyor}
  - 15/10 . with movement in a path composed of one or more straight lines, e.g. compound {, the movement being in alternate horizontal and vertical directions}
  - 15/105 . . {the articles, e.g. can lids, discs, being conveyed by means of rotating screw spindles}
  - 15/12 . . the lines being all horizontal or slightly inclined
  - 15/122 . . . {the objects or batches of material being carried by transversely moving rollers or rods which may rotate}
  - 15/124 . . . . {the objects being yarn hanks}
  - 15/126 . . . . {the material being "pasta" products, e.g. spaghetti}
  - 15/128 . . . . {the rods being attached at one end to an endless conveying means, the other end being free to receive hollow articles, e.g. cans}
  - 15/14 . . . the objects or batches of materials being carried by trays or racks {or receptacles, which may be connected to endless chains or belts (trays, racks per se F26B 25/18; with vertical movement F26B 15/22)}
  - 15/143 . . . . {the receptacles being wholly or partly foraminous, e.g. containing a batch of loose material (F26B 15/146, F26B 15/205, F26B 15/26 take precedence)}
  - 15/146 . . . . {applying multiple superimposed tray conveyors, the materials to be dried being dropped onto subsequent conveyor stretches, e.g. by allowing the trays to tilt at one point}
  - 15/16 . . . the objects or batches of materials being carried by wheeled trucks
  - 15/18 . . . the objects or batches of materials being carried by endless belts
  - 15/20 . . the lines being all vertical or steeply inclined
  - 15/205 . . . {the objects or batches of materials being carried by a vertical stack of foraminous trays or shelves either moving through a shaft or forming, with their edges, a moving shaft, the shaft being supplied with drying air}
  - 15/22 . . . the objects or batches of materials being carried by endless belts {the objects or batches of material being carried by trays or holders supported by endless belts or chains (F26B 15/205 takes precedence; vertical bulk material conveyor-driers F26B 17/06)}
  - 15/24 . . . . in a zig-zag path

- 15/26 . with movement in a helical path
- 17/00 Machines or apparatus for drying materials in loose, plastic, or fluidised form, e.g. granules, staple fibres, with progressive movement**  
([F26B 13/00](#) takes precedence {; feed or discharge arrangements [F26B 25/002](#)})
- 17/001 . {the material moving down superimposed floors (superimposed belts [F26B 17/08](#))}
- 17/002 . . {with floors which may rotate and turn over as a whole or in part, e.g. around a horizontal axis (superimposed tray conveyors [F26B 15/146](#))}
- 17/003 . . {with fixed floors provided with scrapers ([F26B 17/006](#) and [F26B 17/007](#) take precedence)}
- 17/005 . . {with rotating floors, e.g. around a vertical axis, which may have scrapers ([F26B 17/002](#), [F26B 17/006](#), [F26B 17/007](#) take precedence)}
- 17/006 . . {the movement being imparted by oscillation or vibration}
- 17/007 . . {having a sieve, e.g. classifying arrangement}
- 17/008 . {the material being a slurry or paste applied onto moving elements, e.g. chains, plates, for drying thereon, and subsequently removed therefrom (the element being an endless web or belt-like conveyor [F26B 17/023](#); the element being a disc [F26B 17/282](#); the element being loose inert particles [F26B 3/205](#))}
- 17/02 . with movement performed by belts carrying the materials; with movement performed by belts {or elements attached to endless belts or chains} propelling the materials over stationary surfaces {(the movement being in a helical path [F26B 15/26](#); [F26B 17/003](#), [F26B 17/263](#) take precedence)}
- 17/023 . . {the material being a slurry or paste, which adheres to a moving belt-like endless conveyor for drying thereon, from which it may be removed in dried state, e.g. by scrapers, brushes or vibration}
- 17/026 . . {the material being moved in-between belts which may be perforated}
- 17/04 . . the belts being all horizontal or slightly inclined ([F26B 17/08](#) takes precedence)
- 17/045 . . . {the material on the belt being agitated, dispersed or turned over by mechanical means, e.g. by vibrating the belt, by fixed, rotating or oscillating elements}
- 17/06 . . the belts being all vertical or steeply inclined ([F26B 17/08](#) takes precedence {; for materials in discrete batches [F26B 15/22](#)})
- 17/08 . . the belts being arranged in a sinuous or zig-zag path {([F26B 17/026](#) takes precedence; superimposed tray conveyors [F26B 15/146](#))}
- 17/10 . with movement performed by fluid currents, e.g. issuing from a nozzle, {e.g. pneumatic, flash, vortex or entrainment dryers} ([F26B 3/08](#) takes precedence)
- 17/101 . . {the drying enclosure having the shape of one or a plurality of shafts or ducts, e.g. with substantially straight and vertical axis ([F26B 17/107](#) takes precedence)}
- 17/102 . . . {with material recirculation, classifying or disintegrating means ([F26B 17/103](#) takes precedence)}
- 17/103 . . . {with specific material feeding arrangements, e.g. combined with disintegrating means}
- 17/104 . . . {with fixed or moving internal bodies for defining or changing the course of the entrained material}
- 17/105 . . . {the shaft or duct, e.g. its axis, being other than straight, i.e. curved, zig-zag, closed-loop, spiral}
- 17/106 . . {the drying enclosure, e.g. its axis, being substantially straight and horizontal, e.g. pneumatic drum dryers; the drying enclosure consisting of multiple substantially straight and horizontal stretches ([F26B 17/107](#) takes precedence)}
- 17/107 . . {pneumatically inducing within the drying enclosure a curved flow path, e.g. circular, spiral, helical; Cyclone or Vortex dryers (swirl or curved flow path induced mechanically, i.e. by rotating element [F26B 3/0923](#))}
- 17/108 . . {using impinging streams of entrained material}
- 17/12 . with movement performed solely by gravity {, i.e. the material moving through a substantially vertical drying enclosure, e.g. shaft}
- 17/122 . . {the material moving through a cross-flow of drying gas; the drying enclosure, e.g. shaft, consisting of substantially vertical, perforated walls}
- 17/124 . . . {the vertical walls having the shape of at least two concentric cylinders with the material to be dried moving in-between}
- 17/126 . . . {the vertical walls consisting of baffles, e.g. in louvre-arrangement}
- 17/128 . . {with provisions for working under reduced or increased pressure, with or without heating}
- 17/14 . . the materials moving through a counter-current of gas
- 17/1408 . . . {the gas being supplied and optionally extracted through ducts extending into the moving stack of material (in combination with fluid-heated closed tubes or other heating elements in contact with the stack of material [F26B 17/16](#))}
- 17/1416 . . . . {the ducts being half open or perforated and arranged horizontally}
- 17/1425 . . . . {the ducts being perforated and arranged vertically}
- 17/1433 . . . {the drying enclosure, e.g. shaft, having internal members or bodies for guiding, mixing or agitating the material, e.g. imposing a zig-zag movement onto the material ([F26B 17/1408](#), [F26B 17/16](#) take precedence)}
- 17/1441 . . . . {the members or bodies being stationary, e.g. fixed panels, baffles, grids, the position of which may be adjustable}
- 17/145 . . . . {consisting of non-perforated panels or baffles}
- 17/1458 . . . . {consisting of perforated panels or baffles; consisting of grids}
- 17/1466 . . . . {the members or bodies being in movement}
- 17/1475 . . . . {the movement being a vibration or oscillation ([F26B 17/26](#) takes precedence)}
- 17/1483 . . . . {the movement being a rotation around a vertical axis}
- 17/1491 . . . . {the movement being a rotation around a horizontal axis}

- 17/16 . . the materials passing down a heated surface {, e.g. fluid-heated closed ducts or other heating elements in contact with the moving stack of material (F26B 17/128 takes precedence)}
- 17/18 . with movement performed by rotating helical blades or other rotary conveyors {which may be heated} moving materials in stationary chambers {, e.g. troughs}
- 17/20 . . the axis of rotation being horizontal or slightly inclined
- 17/205 . . . {with multiple chambers, e.g. troughs, in superimposed arrangement}
- 17/22 . . the axis of rotation being vertical or steeply inclined {(F26B 17/003 takes precedence)}
- 17/24 . with movement performed by shooting or throwing the materials {, e.g. after which the materials are subject to impact (F26B 17/108 takes precedence)}
- 17/26 . with movement performed by reciprocating or oscillating conveyors propelling materials over stationary surfaces; with movement performed by reciprocating or oscillating shelves, sieves, or trays {(F26B 17/006 takes precedence)}
- 17/263 . . {the conveying element making a rotary working movement while being transversely moved in one direction, the reverse or return movement being effected in an inoperative state, e.g. lifted, in rest}
- 17/266 . . {the materials to be dried being moved in a helical, spiral or circular path, e.g. vibrated helix}
- 17/28 . with movement performed by rollers or discs with material passing over or between them, e.g. suction drum, sieve {, the axis of rotation being in fixed position (moving rotating rollers F26B 15/122)}
- 17/282 . . {the materials adhering to, and being dried on, the surface of rotating discs with or without scraping devices}
- 17/284 . . {the materials being dried on the non-perforated surface of heated rollers or drums (arrangements for heating or cooling drums, for removal of condensate F26B 13/183)}
- 17/286 . . . {Arrangements for application of materials to be dried onto the drums or rollers; Arrangements for removing dried materials from the drums or rollers, e.g. doctor blades}
- 17/288 . . {the materials being dried on perforated drums or rollers, e.g. sieve or suction drums}
- 17/30 . with movement performed by rotary or oscillating containers; with movement performed by rotary floors {(the material moving down superimposed floors F26B 17/001)}
- 17/32 . . the movement being in a horizontal or slightly inclined plane
- 17/34 . . the movement being in a vertical or steeply inclined plane

**19/00 Machines or apparatus for drying solid materials or objects not covered by groups F26B 9/00 - F26B 17/00**

- 19/005 . {Self-contained mobile devices, e.g. for agricultural produce (movable devices with radiation means F26B 3/28; small self-contained devices for drying objects at rest F26B 9/003)}

**20/00 Combinations of machines or apparatus covered by two or more of groups F26B 9/00 - F26B 19/00**

**Details of general application**

- 21/00 Arrangements {or duct systems, e.g. in combination with pallet boxes,} for supplying and controlling air or gases for drying solid materials or objects** {(F26B 9/10 takes precedence; systems for vehicle body drying B60S 3/002); air conditioning or ventilation in general F24F)
  - 21/001 . {Drying-air generating units, e.g. movable, independent of drying enclosure}
  - 21/002 . . {heating the drying air indirectly, i.e. using a heat exchanger (F26B 23/001 takes precedence; closed-loop systems F26B 23/10)}
  - 21/003 . {Supply-air or gas filters}
  - 21/004 . {Nozzle assemblies; Air knives; Air distributors; Blow boxes (F26B 3/082, F26B 13/104, F26B 13/108, F26B 21/006 take precedence)}
  - 21/005 . {Drying-steam generating means}
  - 21/006 . {the gas supply or exhaust being effected through hollow spaces or cores in the materials or objects, e.g. tubes, pipes, bottles (F26B 9/003 and F26B 9/103 take precedence)}
  - 21/007 . . {the objects being bobbin- or spool-like bodies}
  - 21/008 . . {the objects being flexible articles, which may be blown up by the drying gas, e.g. tubes, sausage casings (fire hoses A62C 33/02)}
  - 21/02 . Circulating air or gases in closed cycles, e.g. wholly within the drying enclosure (F26B 21/08, F26B 21/14, {F26B 23/022} take precedence)
    - 21/022 . . {with provisions for changing the drying gas flow pattern, e.g. by reversing gas flow, by moving the materials or objects through subsequent compartments, at least two of which have a different direction of gas flow (varying fan speed F26B 21/12)}
    - 21/024 . . . {by using movable fan units}
    - 21/026 . . . {by reversing fan rotation}
    - 21/028 . . . {by air valves, movable baffles or nozzle arrangements}
    - 21/04 . . partly outside the drying enclosure {(F26B 21/006 takes precedence)}
    - 21/06 . Controlling, e.g. regulating, parameters of gas supply (F26B 21/14 takes precedence; control in general G05)
      - 21/08 . . Humidity
        - 21/083 . . . {by using sorbent or hygroscopic materials, e.g. chemical substances, molecular sieves}
        - 21/086 . . . {by condensing the moisture in the drying medium, which may be recycled, e.g. using a heat pump cycle}
      - 21/10 . . Temperature; Pressure {(F26B 23/026 takes precedence)}
      - 21/12 . . Velocity of flow; Quantity of flow {, e.g. by varying fan speed, by modifying cross flow area (F26B 21/004 takes precedence; changing air flow pattern F26B 21/022)}
      - 21/14 . using gases or vapours other than air or steam {, e.g. inert gases}
      - 21/145 . . {Condensing the vapour onto the surface of the materials to be dried (using condensing steam F26B 3/00; using chemical liquids F26B 5/005)}
- 23/00 Heating arrangements** ({by radiation, e.g. infrared, ultraviolet, solar F26B 3/28 and F26B 3/30}; using heated air or gases F26B 21/00)

- 23/001 . {using waste heat}
  - 23/002 . . {recovered from dryer exhaust gases ([F26B 23/022](#) takes precedence)}
  - 23/004 . . . {by compressing and condensing vapour in exhaust gases, i.e. using an open cycle heat pump system}
  - 23/005 . . . {using a closed cycle heat pump system (with recycling of drying medium [F26B 21/086](#)); using a heat pipe system}
  - 23/007 . . {recovered from the dried product (burning the product [F26B 23/028](#))}
  - 23/008 . . . {using a heat pump cycle}
  - 23/02 . using combustion heating ({[F26B 3/305](#), [F26B 13/186](#), [F26B 21/001](#), } [F26B 23/10](#) take precedence)
  - 23/022 . . {incinerating volatiles in the dryer exhaust gases, the produced hot gases being wholly, partly or not recycled into the drying enclosure}
  - 23/024 . . . {by means of catalytic oxidation}
  - 23/026 . . {with pulse combustion, e.g. pulse jet combustion drying of particulate materials}
  - 23/028 . . {using solid fuel; burning the dried product}
  - 23/04 . using electric heating ([F26B 23/10](#) takes precedence)
  - 23/06 . . resistance heating
  - 23/10 . using tubes or passages containing heated fluids {, e.g. acting as radiative elements; Closed-loop systems (for combustion gases [F26B 3/305](#))}
  - 25/00** **Details of general application not covered by group [F26B 21/00](#) or [F26B 23/00](#) (loading, conveying, and unloading in general [B65G](#))**
  - 25/001 . {Handling, e.g. loading or unloading arrangements}
  - 25/002 . . {for bulk goods ([F26B 17/103](#) takes precedence)}
  - 25/003 . . {for articles}
  - 25/004 . . . {in the shape of discrete sheets (wicket conveyors [F26B 15/085](#))}
  - 25/005 . {Treatment of dryer exhaust gases (incineration of volatiles [F26B 23/022](#))}
  - 25/006 . . {Separating volatiles, e.g. recovering solvents from dryer exhaust gases}
  - 25/007 . . {Dust filtering; Exhaust dust filters}
  - 25/008 . {Seals, locks, e.g. gas barriers or air curtains, for drying enclosures ([F26B 11/024](#) and [F26B 13/005](#) take precedence)}
  - 25/009 . {Alarm systems; Safety systems, e.g. preventing fire and explosions (using inert gases [F26B 21/14](#))}
  - 25/02 . Applications of driving mechanisms, not covered by another subclass
  - 25/04 . Agitating, stirring, or scraping devices {(arrangement of doctor blades [F26B 17/286](#))}
  - 25/06 . Chambers, containers, or receptacles {(large containers having means for heating, cooling, aerating or other conditioning of contents [B65D 88/74](#))}
  - 25/063 . . {Movable containers or receptacles, e.g. carts, trolleys, pallet-boxes (for use in freeze-drying apparatus [F26B 5/06](#); in general [B62D](#))}
  - 25/066 . . {Movable chambers, e.g. collapsible, demountable (self-contained mobile devices, e.g. for agricultural produce [F26B 19/005](#))}
  - 25/08 . . Parts thereof
  - 25/10 . . . Floors, roofs, or bottoms; False bottoms
  - 25/12 . . . Walls or sides; Doors
  - 25/14 . . Chambers, containers, receptacles of simple construction
  - 25/16 . . . mainly closed, e.g. drum
  - 25/18 . . . mainly open, e.g. dish, tray, pan {, rack (for drying agricultural produce [A01F 25/12](#))}
  - 25/185 . . . . {Spacers; Elements for supporting the goods to be dried, i.e. positioned in-between the goods to build a ventilated stack (separators for articles packaged in stacks [B65D 57/00](#); manipulating spacers for stacking purposes [B65G 57/005](#))}
  - 25/20 . Rollers ([F26B 25/06](#), [F26B 13/14](#)) take precedence)
  - 25/22 . Controlling the drying process in dependence on liquid content of solid materials or objects
  - 25/225 . . {by repeated or continuous weighing of the material or a sample thereof}
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- 2200/00** **Drying processes and machines for solid materials characterised by the specific requirements of the drying good**
  - 2200/02 . Biomass, e.g. waste vegetative matter, straw
  - 2200/04 . Garbage
  - 2200/06 . Grains, e.g. cereals, wheat, rice, corn
  - 2200/08 . Granular materials
  - 2200/10 . Grass
  - 2200/12 . Manure
  - 2200/14 . Sand
  - 2200/16 . Sea weed; Marine products
  - 2200/18 . Sludges, e.g. sewage, waste, industrial processes, cooling towers
  - 2200/20 . Teas, i.e. drying, conditioning, withering of tea leaves
  - 2200/22 . Tobacco leaves
  - 2200/24 . Wood particles, e.g. shavings, cuttings, saw dust
  - Drying processes and machines for solid materials or objects characterised by the specific requirements of the drying good**
  - 2210/00** **Drying processes and machines for solid objects characterised by the specific requirements of the drying good**
  - 2210/02 . Ceramic articles or ceramic semi-finished articles
  - 2210/04 . Eggs
  - 2210/06 . Long pasta, e.g. spaghetti
  - 2210/08 . Short pasta, e.g. macaroni, vermicelli
  - 2210/10 . Umbrellas
  - 2210/12 . Vehicle bodies, e.g. after being painted
  - 2210/14 . Veneer, i.e. wood in thin sheets
  - 2210/16 . Wood, e.g. lumber, timber