CPC COOPERATIVE PATENT CLASSIFICATION

B PERFORMING OPERATIONS; TRANSPORTING

(NOTES omitted)

SEPARATING; MIXING

B02 CRUSHING, PULVERISING, OR DISINTEGRATING; PREPARATORY TREATMENT OF GRAIN FOR MILLING

B02C CRUSHING, PULVERISING, OR DISINTEGRATING IN GENERAL; MILLING GRAIN ({household tools and machines for pulverising foodstuffs, e.g. coffee and spice mills A47J 42/00; pharmaceutical mortars A61J 3/02; mechanical processing of refuse and garbage B03B 9/06; dressing mould materials by grinding B22C 5/04}; obtaining metallic powder by crushing, grinding or milling B22F 9/04; {recovery of plastics by disintegrating B29B 17/00; crushing raw materials in starch making C08B 30/02; beaters for papermaking D21D 1/02; crushing devices specially for transport in mines E21F 13/002; slag crushing devices F23J 1/00; fuel milling devices in combustion apparatus F23K 1/00; household devices for crushing coal F24B 15/02; ice disintegrating devices F25C 5/02})

WARNING

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

1/00 **Crushing or disintegrating by reciprocating members**

1/005 . {hydraulically or pneumatically operated}
1/02 . Jaw crushers or pulverisers
1/025 . . {Jaw clearance or overload control}
1/04 . . with single-acting jaws
1/043 . . . {with cooperating single acting jaws}
1/046 . . . {of the plural stage type}
1/06 . . with double-acting jaws
1/08 . . with jaws coacting with rotating roller
1/10 . . Shape or construction of jaws
1/12 . Mills with non-rotating spiked members
1/14 . Stamping mills

2/00 **Crushing or disintegrating by gyratory or cone crushers {(with non-coaxial discs with intersecting axes B02C 7/005)}**

2002/002 . {the bowl being a driven element for providing a crushing effect}
2/005 . {Lining}
2/007 . {Feeding devices}
2/02 . eccentrically moved
2/04 . . with vertical axis
2/042 . . . {Moved by an eccentric weight}
2/045 . . . {and with bowl adjusting or controlling mechanisms (B02C 2/042, B02C 2/06 take precedence)}
2/047 . . . {and with head adjusting or controlling mechanisms (B02C 2/042, B02C 2/06 take precedence)}
2/06 . . . and with top bearing {(B02C 2/042 takes precedence)}
2/08 . . with horizontal axis
2/10 . concentrically moved; Bell crushers

4/00 **Crushing or disintegrating by roller mills** (with milling members in the form of rollers or balls co-operating with rings or discs B02C 15/00; roller mills or roll refiners exclusively for chocolate A23G 1/10, A23G 1/12)

4/02 . with two or more rollers
4/04 . . specially adapted for milling paste-like material, e.g. paint, chocolate, colloids
4/06 . . specially adapted for milling grain
4/08 . . with co-operating corrugated or toothed crushing-rollers
4/10 . with a roller co-operating with a stationary member
4/12 . . in the form of a plate
4/14 . . . specially adapted for milling paste-like material, e.g. paint, chocolate, colloids
4/16 . . . specially adapted for milling grain
4/18 . . in the form of a bar
4/20 . . . wherein the roller is corrugated or toothed
4/22 . . . specially adapted for milling paste-like material, e.g. paint, chocolate, colloids
4/24 . . . specially adapted for milling grain
4/26 . . in the form of a grid or grating
4/28 . Details
4/283 . . {Lateral sealing shields}
4/286 . . {Feeding devices}
4/30 . . Shape or construction of rollers
4/305 . . . {Wear resistant rollers}
4/32 . . Adjusting, applying pressure to, or controlling the distance between, milling members
4/34 . . . in mills wherein a roller co-operates with a stationary member

4/36 . . . in mills specially adapted for paste-like materials
4/38 . . . in grain mills
4/40 . . Detachers, e.g. scrapers
4/42 . . Driving mechanisms; Roller speed control
4/423 . . . {with vibrating or oscillating mechanisms}
4/426 . . . {Torque counterbalancing mechanisms}
4/44 . . Cooling or heating rollers or bars

7/00 Crushing or disintegrating by disc mills (apparatus specially adapted for manufacture or treatment of cocoa or cocoa products exclusively A23G 1/04)
7/005 . {Crushers with non-coaxial toothed discs with intersecting axes}
7/02 . with coaxial discs
7/04 . . with concentric circles of intermeshing teeth
7/06 . . with horizontal axis (B02C 7/04 takes precedence)
7/08 . . with vertical axis (B02C 7/04 takes precedence)
7/10 . with eccentric discs
7/11 . Details
7/12 . . Shape or construction of discs
7/13 . . . for grain mills
7/14 . . Adjusting, applying pressure to, or controlling distance between, discs
7/16 . . Driving mechanisms
7/17 . . Cooling or heating of discs
7/175 . Disc mills specially adapted for paste-like material, e.g. paint, chocolate, colloids
7/18 . Disc mills specially adapted for grain
7/182 . . {with horizontal axis}
7/184 . . {with vertical axis}
7/186 . . {Adjusting, applying pressure to, or controlling distance between, discs}
7/188 . . {Driving mechanisms}

9/00 Other milling methods or mills specially adapted for grain
9/02 . Cutting or splitting grain
9/04 . Systems or sequences of operations; Plant

11/00 Other auxiliary devices or accessories specially adapted for grain mills
11/02 . Breaking up amassed particles, e.g. flakes
11/04 . Feeding devices
11/06 . Arrangements for preventing fire or explosion (methods for preventing or extinguishing fires, devices therefor A62C)
11/08 . Cooling, heating, ventilating, conditioning with respect to temperature or water content (conditioning grain before milling B02B 1/08; air-conditioning or ventilating in general F24F)

13/00 Disintegrating by mills having rotary beater elements {; Hammer mills}
13/02 . with horizontal rotor shaft (with axial flow B02C 13/10)
13/04 . . with beaters hinged to the rotor; Hammer mills
13/06 . . with beaters rigidly connected to the rotor
13/08 . . . and acting as a fan
13/09 . . . and throwing the material against an anvil or impact plate {(with vertical axis B02C 13/1807)}
13/095 . . . . {with an adjustable anvil or impact plate}
13/10 . with horizontal rotor shaft and axial flow
13/12 . . with vortex chamber
13/13 . with horizontal rotor shaft and combined with sifting devices, e.g. for making powdered fuel
13/14 . with vertical rotor shaft, e.g. combined with sifting devices
2013/145 . . {with fast rotating vanes generating vortexes effecting material on material impact}
13/16 . . with beaters hinged to the rotor
13/18 . . with beaters rigidly connected to the rotor
13/1807 . . . {the material to be crushed being thrown against an anvil or impact plate (with horizontal axis B02C 13/09; centrifugal acceleration of material through radially extending channels B02C 19/0025; centrifugal acceleration of material by means of an open top rotor B02C 19/0031)}
13/1814 . . . . {by means of beater or impeller elements fixed on top of a disc type rotor}
13/1821 . . . . . {the beater or impeller elements being rotatably fixed around their own axis}
13/1828 . . . . . {with dead bed protected beater or impeller elements}
13/1835 . . . . {by means of beater or impeller elements fixed in between an upper and lower rotor disc}
13/1842 . . . . . {with dead bed protected beater or impeller elements}
13/185 . . . . {Construction or shape of anvil or impact plate}
2013/1857 . . . . {rotating coaxially around the rotor shaft}
2013/1864 . . . . {rotatable around its own axis}
2013/1871 . . . . {vertically adjustable}
2013/1878 . . . . {radially adjustable}
2013/1885 . . . . {of dead bed type}
2013/1892 . . . . {cooled or heated}
13/20 . with two or more co-operating rotors
13/205 . . {arranged concentrically}
13/22 . with intermeshing pins {; Pin Disk Mills}
13/24 . . arranged around a vertical axis
13/26 . Details
13/28 . . Shape or construction of beater elements
13/2804 . . . {the beater elements being rigidly connected to the rotor}
2013/2808 . . . {the beater elements are attached to disks mounted on a shaft}
2013/2812 . . . {the beater elements are attached to a hollow cylindrical rotor}
2013/2816 . . . {of chain, rope or cable type}
13/282 . . Shape or inner surface of mill-housings
2013/2825 . . . {with fastening means for fixing lining members to the inner surface of mill-housings}
13/284 . . . Built-in screens
13/286 . . Feeding or discharge
2013/28609 . . . {Discharge means}
2013/28618 . . . {Feeding means}
2013/28627 . . . . {of ram or pusher type}
2013/28636 . . . . {of conveyor belt type}
2013/28645 . . . . {of conveyor belt and cooperating roller type}
2013/28654 . . . . {of screw type}
2013/28663 . . . . {using rollers}
2013/28672 . . . . {Feed chute arrangements}
2013/28681 . . . . {Feed distributor plate for vertical mill}

2013/2869 . . . {Arrangements of feed and discharge means in relation to each other}
13/288 . . Ventilating, or influencing air circulation
2013/29 . . {devices for manipulating beater elements}
13/30 . . Driving mechanisms
13/31 . . Safety devices or measures

15/00 Disintegrating by milling members in the form of rollers or balls co-operating with rings or discs {(high-speed drum mills B02C 19/11)}

15/001 . {Air flow directing means positioned on the periphery of the horizontally rotating milling surface}
2015/002 . {combined with a classifier}
15/003 . {Shape or construction of discs or rings}
15/004 . {Shape or construction of rollers or balls}
15/005 . . {Rollers or balls of composite construction}
15/006 . {Ring or disc drive gear arrangement}
15/007 . {Mills with rollers pressed against a rotary horizontal disc (with pendularly mounted rollers B02C 15/04)}
2015/008 . {Roller drive arrangements}
15/02 . Centrifugal pendulum-type mills
15/04 . Mills with pressed pendularly-mounted rollers, e.g. spring pressed
15/045 . . {pressed against the interior of a ring rotating in a vertical plane}
15/06 . Mills with rollers forced against the interior of a rotary ring, e.g. under spring action (B02C 15/04 takes precedence)
15/08 . Mills with balls or rollers centrifugally forced against the inner surface of a ring, the balls or rollers of which are driven by a centrally arranged member (B02C 15/02 takes precedence)
15/10 . Mills with balls or rollers centrifugally forced against the inner surface of a ring, the balls or rollers of which are driven by other means than a centrally-arranged member
15/12 . Mills with at least two discs {or rings} and interposed balls or rollers mounted like ball or roller bearings
15/123 . . {with rings and interposed rollers}
2015/126 . . {of the plural stage type}
15/14 . Edge runners, e.g. Chile mills
2015/143 . . {each runner pivot carrying more than one runner}
2015/146 . . {Step-shaped runners}
15/16 . with milling members essentially having different peripheral speeds and in the form of a hollow cylinder or cone and an internal roller or cone

17/00 Disintegrating by tumbling mills, i.e. mills having a container charged with the material to be disintegrated with or without special disintegrating members such as pebbles or balls (high-speed drum mills B02C 19/11 {; drums for polishing or grinding B24B})

17/002 . {with rotary cutting or beating elements}
17/005 . {the charge being turned over by magnetic forces}
17/007 . {specially adapted for disintegrating refuse}
17/02 . with perforated container
17/04 . with unperforated container
17/06 . . with several compartments
2017/065 . . . {with several compartments in the form of multiwell blocks}
17/07 . . . in radial arrangement
17/08 . . with containers performing a planetary movement
17/10 . with one or a few disintegrating members arranged in the container
17/14 . Mills in which the charge to be ground is turned over by movements of the container other than by rotating, e.g. by swinging, vibrating, tilting {(mills provided with vibrators in general B02C 19/16)}
17/16 . Mills in which a fixed container houses stirring means tumbling the charge
17/161 . . {Arrangements for separating milling media and ground material}
17/163 . . {Stirring means}
2017/165 . . {with stirring means comprising more than one agitator}
17/166 . . {of the annular gap type}
17/168 . . {with a basket media milling device arranged in or on the container, involving therein a circulatory flow of the material to be milled}
17/18 . Details
17/1805 . . {Monitoring devices for tumbling mills}
17/181 . . {Bearings specially adapted for tumbling mills}
17/1815 . . {Cooling or heating devices}
17/182 . . {Lids}
17/1825 . . {Lifting devices (lifting devices associated with the lining for containers B02C 17/22)}
17/183 . . {Feeding or discharging devices}
17/1835 . . . {Discharging devices combined with sorting or separating of material (B02C 17/186 takes precedence)}
17/184 . . . . {with separator arranged in discharge path of crushing zone}
17/1845 . . . . . {with return of oversize material to crushing zone}
17/185 . . . . {with more than one separator}
17/1855 . . . . {with separator defining termination of crushing zone, e.g. screen denying egress of oversize material}
17/186 . . . {Adding fluid, other than for crushing by fluid energy}
17/1865 . . . . {after crushing}
17/187 . . . . . {with recirculation of material to crushing zone}
17/1875 . . . . {passing gas through crushing zone}
17/188 . . . . . {characterised by point of gas entry or exit or by gas flow path}
17/1885 . . . . . {the applied gas acting to effect material separation (B02C 17/1895 takes precedence)}
17/189 . . . . . {with return of oversize material to crushing zone (B02C 17/1895 takes precedence)}
17/1895 . . . . . {gas being recirculated to crushing zone}
17/20 . . Disintegrating members
17/205 . . . {Adding disintegrating members to the tumbling mill}
17/22 . . Lining for containers
17/225 . . . {using rubber or elastomeric material}
17/24 . . Driving mechanisms

18/00 Disintegrating by knives or other cutting or tearing members which chop material into fragments {(tree stump comminutors A01G 23/067)}

18/0007 . {specially adapted for disintegrating documents}

2018/0015 . . {for disintegrating CDs, DVDs and/or credit cards}
2018/0023 . . {Switching devices}
2018/003 . . {Removing clips, pins or staples before disintegrating}
2018/0038 . . {Motor drives}
2018/0046 . . {Shape or construction of frames, housings or casings}
2018/0053 . . {hand-operated}
2018/0061 . . {with compacting devices for the disintegrated material}
2018/0069 . . {with stripping devices}
18/0076 . {with cutting or tearing members fixed on endless flexible members (without cutting or tearing members B02C 19/0006)}
18/0084 . {specially adapted for disintegrating garbage, waste or sewage}
18/0092 . . {for waste water or for garbage}
18/02 . with reciprocating knives
18/04 . . Details
18/06 . with rotating knives
18/062 . . {with rotor elements extending axially in close radial proximity of a concentrically arranged slotted or perforated ring}
18/065 . . {within rotatable bowls, e.g. meat cutters}
18/067 . . {Tub-grinders}
18/08 . . within vertical containers {(B02C 18/062, B02C 18/065 take precedence)}
18/083 . . . {with a disc rotor having generally radially extending slots or openings bordered with cutting knives}
18/086 . . . {specially adapted for disintegrating plastics, e.g. cinematographic films (for plastic bottles B02C 19/0093, disintegrating plastics B29B 17/00)}
18/10 . . . with drive arranged above container {(B02C 18/083 takes precedence)}
18/12 . . . with drive arranged below container {(B02C 18/083 takes precedence)}
18/14 . . within horizontal containers {(B02C 18/062, B02C 18/065 take precedence)}
18/141 . . . {with axial flow}
18/142 . . . {with two or more inter-engaging rotatable cutter assemblies}
18/143 . . . {with a disc rotor having generally radially extending slots or openings bordered with cutting knives}
18/144 . . . {with axially elongated knives}
18/145 . . . {with knives spaced axially and circumferentially on the periphery of a cylindrical rotor unit}
18/146 . . . {with a rotor comprising a plurality of axially contiguous disc-like segments each having at least one radially extending cutting element}
2018/147 . . . {of the plural stage type}
18/148 . . . {specially adapted for disintegrating plastics, e.g. cinematographic films (for plastic bottles B02C 19/0093, disintegrating plastics B29B 17/00)}
18/16 . . Details
2018/162 . . . {Shape or inner surface of shredder-housings}
2018/164 . . . {Prevention of jamming and/or overload}
2018/166 . . . {Lubricating the knives of the cutting mechanisms}
2018/168 . . . {User safety devices or measures in shredders}
18/18 . . . Knives; Mountings thereof
18/182 . . . . {Disc-shaped knives}
18/184 . . . . . {with peripherally arranged demountable cutting tips or elements}
18/186 . . . . {Axially elongated knives}
2018/188 . . . . {Stationary counter-knives; Mountings thereof}
18/20 . . . . Sickle-shaped knives
18/22 . . . Feed or discharge means
2018/2208 . . . . {for weblike material}
18/2216 . . . . {Discharge means}
18/2225 . . . . {Feed means}
18/2233 . . . . . {of ram or pusher type}
18/2241 . . . . . {of conveyor belt type (B02C 18/225 takes precedence)}
18/225 . . . . . {of conveyor belt and cooperating roller type}
18/2258 . . . . . {of screw type}
18/2266 . . . . . {of revolving drum type}
18/2275 . . . . . {using a rotating arm}
18/2283 . . . . . {using rollers (B02C 18/225 takes precedence)}
18/2291 . . . . . {Feed chute arrangements}
18/24 . . . Drives
18/26 . with knives which both reciprocate and rotate
18/28 . with spiked cylinders
18/30 . Mincing machines with perforated discs and feeding worms
18/301 . . {with horizontal axis}
18/302 . . . {with a knife-perforated disc unit}
18/304 . . . {with several axially aligned knife-perforated disc units}
18/305 . . {Details}
2018/307 . . . {Cooling arrangements in mincing machines}
2018/308 . . {with separating devices for hard material, e.g. bone}
18/32 . . with sharpening devices
18/34 . . with means for cleaning the perforated discs
18/36 . . Knives or perforated discs
18/362 . . . {Knives}
18/365 . . . {Perforated discs}
2018/367 . . . {Resiliently mounted knives or discs}
18/38 . . Drives

19/00 Other disintegrating devices or methods (for grain B02C 9/00)

19/0006 . {Crushing by endless flexible members (with cutting or tearing members B02C 18/0076)}
19/0012 . {Devices for disintegrating materials by collision of these materials against a breaking surface or breaking body and/or by friction between the material particles (also for grain)}
19/0018 . . {using a rotor accelerating the materials centrifugally against a circumferential breaking surface (rotors with beater elements B02C 13/09, B02C 13/1807)}
19/0025 . . . {by means of a rotor with radially extending channels}
19/0031 . . . {by means of an open top rotor}
19/0037 . . . . {with concentrically arranged open top rotors}

19/0043 . . {the materials to be pulverised being projected against a breaking surface or breaking body by a pressurised fluid (jet mills B02C 19/06)}
19/005 . . {the materials to be pulverised being disintegrated by collision of, or friction between, the material particles (jet mills B02C 19/06)}
19/0056 . {specially adapted for specific materials not otherwise provided for}
19/0062 . . {specially adapted for shredding scrap metal, e.g. automobile bodies}
19/0068 . . {specially adapted for breaking-up fluorescent tubes}
19/0075 . . {specially adapted for disintegrating medical waste (sterilisation of refuse A61L 11/00; disposal of medical waste B09B 3/00)}
19/0081 . . {specially adapted for breaking-up bottles}
19/0087 . . . {for glass bottles}
19/0093 . . . {for plastic bottles}
19/06 . Jet mills
19/061 . . {of the cylindrical type (B02C 19/068 takes precedence)}
19/063 . . {of the toroidal type (B02C 19/068 takes precedence)}
19/065 . . {of the opposed-jet type (B02C 19/068 takes precedence)}
19/066 . . {of the jet-anvil type (B02C 19/068 takes precedence)}
19/068 . . {of the fluidised-bed type}
19/08 . Pestle and mortar
19/10 . Mills in which a friction block is towed along the surface of a cylindrical or annular member
19/11 . High-speed drum mills (for separating B04B)
19/16 . Mills provided with vibrators ({roller mills B02C 4/423}; tumbling mills B02C 17/14)
19/18 . Use of auxiliary physical effects, e.g. ultrasonics, irradiation, for disintegrating
2019/183 . . {Crushing by discharge of high electrical energy}
19/186 . . {Use of cold or heat for disintegrating (B02C 4/44, B02C 7/17, B02C 11/08 take precedence)}
19/20 . Disintegrating by grating {(domestic food grating devices A47J 43/25)}
19/22 . Crushing mills with screw-shaped crushing means

21/00 Disintegrating plant with or without drying of the material (for grain B02C 9/04)

21/002 . {using a combination of a roller mill and a drum mill}
21/005 . . {the roller mill having cooperating rollers}
21/007 . {using a combination of two or more drum or tube mills}
21/02 . Transportable disintegrating plant
2021/023 . . {for disintegrating material on the surface of the ground}
21/026 . . {self-propelled}

23/00 Auxiliary methods or auxiliary devices or accessories specially adapted for crushing or disintegrating not provided for in preceding groups or not specially adapted to apparatus covered by a single preceding group ({specially adapted for grain mills B02C 11/00;} separating or sorting in general B03, B04, B07)

23/02 . Feeding devices ({for grain mills B02C 11/04; for roller mills B02C 4/286}; transport devices in general B65G)
23/04 . Safety devices (in general F16P {; for rotary mills B02C 13/31})
23/06 . Selection or use of additives to aid disintegrating
23/08 . Separating or sorting of material, associated with crushing or disintegrating (B02C 23/18 takes precedence {; beater mills combined with sifting devices B02C 13/13, B02C 13/14; for tumbling mills B02C 17/1835})
23/10 . . with separator arranged in discharge path of crushing or disintegrating zone
23/12 . . . with return of oversize material to crushing or disintegrating zone
23/14 . . with more than one separator
23/16 . . with separator defining termination of crushing or disintegrating zone, e.g. screen denying egress of oversize material
2023/165 . . . {Screen denying egress of oversize material}
23/18 . Adding fluid, other than for crushing or disintegrating by fluid energy ({for tumbling mills B02C 17/186;} feeding devices B02C 23/02)
23/20 . . after crushing or disintegrating
23/22 . . . with recirculation of material to crushing or disintegrating zone
23/24 . . Passing gas through crushing or disintegrating zone ({B02C 15/001}, B02C 23/38, B02C 23/40 take precedence)
23/26 . . . characterised by point of gas entry or exit or by gas flow path
23/28 . . . gas moving means being integral with, or attached to, crushing or disintegrating element
23/30 . . . the applied gas acting to effect material separation (B02C 23/34 takes precedence)
23/32 . . . with return of oversize material to crushing or disintegrating zone (B02C 23/34 takes precedence)
23/34 . . . gas being recirculated to crushing or disintegrating zone
23/36 . . the crushing or disintegrating zone being submerged in liquid
23/38 . . in apparatus having multiple crushing or disintegrating zones
23/40 . . with more than one means for adding fluid to the material being crushed or disintegrated

25/00 Control arrangements specially adapted for crushing or disintegrating

2201/00 Codes relating to disintegrating devices adapted for specific materials

2201/02 . for reinforced concrete
2201/04 . for used tyres
2201/06 . for garbage, waste or sewage
2201/063 . . for waste water or sewage
2201/066 . . for garden waste

2210/00 Codes relating to different types of disintegrating devices

2210/01 . Indication of wear on beaters, knives, rollers, anvils, linings and the like
2210/02 . Features for generally used wear parts on beaters, knives, rollers, anvils, linings and the like