

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	2/10	. concentrically moved; Bell crushers
1/005	. {hydraulically or pneumatically operated}	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)
1/02	. Jaw crushers or pulverisers	4/02	. with two or more rollers
1/025	. . {Jaw clearance or overload control}	4/04	. . specially adapted for milling paste-like material, e.g. paint, chocolate, colloids
1/04	. . with single-acting jaws	4/06	. . specially adapted for milling grain
1/043	. . . {with cooperating single acting jaws}	4/08	. . with co-operating corrugated or toothed crushing-rollers
1/046	. . . {of the plural stage type}	4/10	. with a roller co-operating with a stationary member
1/06	. . with double-acting jaws	4/12	. . in the form of a plate
1/08	. . with jaws coacting with rotating roller	4/14	. . . specially adapted for milling paste-like material, e.g. paint, chocolate, colloids
1/10	. . Shape or construction of jaws	4/16	. . . specially adapted for milling grain
1/12	. Mills with non-rotating spiked members	4/18	. . in the form of a bar
1/14	. Stamping mills	4/20	. . . wherein the roller is corrugated or toothed
2/00	Crushing or disintegrating by gyratory or cone crushers {(with non-coaxial discs with intersecting axes B02C 7/005)}	4/22	. . . specially adapted for milling paste-like material, e.g. paint, chocolate, colloids
2002/002	. {the bowl being a driven element for providing a crushing effect}	4/24	. . . specially adapted for milling grain
2/005	. {Lining}	4/26	. . in the form of a grid or grating
2/007	. {Feeding devices}	4/28	. Details
2/02	. eccentrically moved	4/283	. . {Lateral sealing shields}
2/04	. . with vertical axis	4/286	. . {Feeding devices}
2/042	. . . {Moved by an eccentric weight}	4/30	. Shape or construction of rollers
2/045	. . . {and with bowl adjusting or controlling mechanisms (B02C 2/042 , B02C 2/06 take precedence)}	4/305	. . . {Wear resistant rollers}
2/047	. . . {and with head adjusting or controlling mechanisms (B02C 2/042 , B02C 2/06 take precedence)}	4/32	. . Adjusting, applying pressure to, or controlling the distance between, milling members
2/06	. . . and with top bearing {(B02C 2/042 takes precedence)}	4/34	. . . in mills wherein a roller co-operates with a stationary member
2/08	. . with horizontal axis		

4/36	. . . in mills specially adapted for paste-like materials	13/12	. . with vortex chamber
4/38	. . . in grain mills	13/13	. with horizontal rotor shaft and combined with sifting devices, e.g. for making powdered fuel
4/40	. . Detachers, e.g. scrapers	13/14	. with vertical rotor shaft, e.g. combined with sifting devices
4/42	. . Driving mechanisms; Roller speed control	2013/145	. . {with fast rotating vanes generating vortexes effecting material on material impact}
4/423	. . . {with vibrating or oscillating mechanisms}	13/16	. . with beaters hinged to the rotor
4/426	. . . {Torque counterbalancing mechanisms}	13/18	. . with beaters rigidly connected to the rotor
4/44	. . Cooling or heating rollers or bars	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)}
7/00	Crushing or disintegrating by disc mills (apparatus specially adapted for manufacture or treatment of cocoa or cocoa products exclusively A23G 1/04)	13/1814	. . . . {by means of beater or impeller elements fixed on top of a disc type rotor}
7/005	. {Crushers with non-coaxial toothed discs with intersecting axes}	13/1821	. . . . . {the beater or impeller elements being rotatably fixed around their own axis}
7/02	. with coaxial discs	13/1828	. . . . . {with dead bed protected beater or impeller elements}
7/04	. . with concentric circles of intermeshing teeth	13/1835	. . . . . {by means of beater or impeller elements fixed in between an upper and lower rotor disc}
7/06	. . with horizontal axis (B02C 7/04 takes precedence)	13/1842	. . . . . {with dead bed protected beater or impeller elements}
7/08	. . with vertical axis (B02C 7/04 takes precedence)	13/185	. . . . . {Construction or shape of anvil or impact plate}
7/10	. with eccentric discs	2013/1857	. . . . . {rotating coaxially around the rotor shaft}
7/11	. Details	2013/1864	. . . . . {rotatable around its own axis}
7/12	. . Shape or construction of discs	2013/1871	. . . . . {vertically adjustable}
7/13	. . . for grain mills	2013/1878	. . . . . {radially adjustable}
7/14	. . Adjusting, applying pressure to, or controlling distance between, discs	2013/1885	. . . . . {of dead bed type}
7/16	. . Driving mechanisms	2013/1892	. . . . . {cooled or heated}
7/17	. . Cooling or heating of discs	13/20	. with two or more co-operating rotors
7/175	. Disc mills specially adapted for paste-like material, e.g. paint, chocolate, colloids	13/205	. . {arranged concentrically}
7/18	. Disc mills specially adapted for grain	13/22	. with intermeshing pins {; Pin Disk Mills}
7/182	. . {with horizontal axis}	13/24	. . arranged around a vertical axis
7/184	. . {with vertical axis}	13/26	. Details
7/186	. . {Adjusting, applying pressure to, or controlling distance between, discs}	13/28	. . Shape or construction of beater elements
7/188	. . {Driving mechanisms}	13/2804	. . . {the beater elements being rigidly connected to the rotor}
9/00	Other milling methods or mills specially adapted for grain	2013/2808	. . . {the beater elements are attached to disks mounted on a shaft}
9/02	. Cutting or splitting grain	2013/2812	. . . {the beater elements are attached to a hollow cylindrical rotor}
9/04	. Systems or sequences of operations; Plant	2013/2816	. . . {of chain, rope or cable type}
11/00	Other auxiliary devices or accessories specially adapted for grain mills	13/282	. . Shape or inner surface of mill-housings
11/02	. Breaking up amassed particles, e.g. flakes	2013/2825	. . . {with fastening means for fixing lining members to the inner surface of mill-housings}
11/04	. Feeding devices	13/284	. . . Built-in screens
11/06	. Arrangements for preventing fire or explosion (methods for preventing or extinguishing fires, devices therefor A62C)	13/286	. . Feeding or discharge
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)	2013/28609	. . . {Discharge means}
13/00	Disintegrating by mills having rotary beater elements {; Hammer mills}	2013/28618	. . . {Feeding means}
13/02	. with horizontal rotor shaft (with axial flow B02C 13/10)	2013/28627	. . . . . {of ram or pusher type}
13/04	. . with beaters hinged to the rotor; Hammer mills	2013/28636	. . . . . {of conveyor belt type}
13/06	. . with beaters rigidly connected to the rotor	2013/28645	. . . . . {of conveyor belt and cooperating roller type}
13/08	. . . and acting as a fan	2013/28654	. . . . . {of screw type}
13/09	. . . and throwing the material against an anvil or impact plate {(with vertical axis B02C 13/1807)}	2013/28663	. . . . . {using rollers}
13/095	. . . . {with an adjustable anvil or impact plate}	2013/28672	. . . . . {Feed chute arrangements}
13/10	. with horizontal rotor shaft and axial flow	2013/28681	. . . . . {Feed distributor plate for vertical mill}

2013/2869	. . . {Arrangements of feed and discharge means in relation to each other}	17/07	. . . in radial arrangement
13/288	. . Ventilating, or influencing air circulation	17/08	. . with containers performing a planetary movement
2013/29	. . {devices for manipulating beater elements}	17/10	. with one or a few disintegrating members arranged in the container
13/30	. . Driving mechanisms	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)}
13/31	. . Safety devices or measures	17/16	. Mills in which a fixed container houses stirring means tumbling the charge
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)}	17/161	. . {Arrangements for separating milling media and ground material}
15/001	. {Air flow directing means positioned on the periphery of the horizontally rotating milling surface}	17/163	. . {Stirring means}
2015/002	. {combined with a classifier}	2017/165	. . {with stirring means comprising more than one agitator}
15/003	. {Shape or construction of discs or rings}	17/166	. . {of the annular gap type}
15/004	. {Shape or construction of rollers or balls}	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}
15/005	. . {Rollers or balls of composite construction}	17/18	. Details
15/006	. {Ring or disc drive gear arrangement}	17/1805	. . {Monitoring devices for tumbling mills}
15/007	. {Mills with rollers pressed against a rotary horizontal disc (with pendularly mounted rollers B02C 15/04)}	17/181	. . {Bearings specially adapted for tumbling mills}
2015/008	. {Roller drive arrangements}	17/1815	. . {Cooling or heating devices}
15/02	. Centrifugal pendulum-type mills	17/182	. . {Lids}
15/04	. Mills with pressed pendularly-mounted rollers, e.g. spring pressed	17/1825	. . {Lifting devices (lifting devices associated with the lining for containers B02C 17/22)}
15/045	. . {pressed against the interior of a ring rotating in a vertical plane}	17/183	. . {Feeding or discharging devices}
15/06	. Mills with rollers forced against the interior of a rotary ring, e.g. under spring action (B02C 15/04 takes precedence)	17/1835	. . . {Discharging devices combined with sorting or separating of material (B02C 17/186 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)	17/184	. . . . {with separator arranged in discharge path of crushing zone}
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	17/1845	. . . . . {with return of oversize material to crushing zone}
15/12	. Mills with at least two discs {or rings} and interposed balls or rollers mounted like ball or roller bearings	17/185	. . . . . {with more than one separator}
15/123	. . {with rings and interposed rollers}	17/1855	. . . . . {with separator defining termination of crushing zone, e.g. screen denying egress of oversize material}
2015/126	. . {of the plural stage type}	17/186	. . . {Adding fluid, other than for crushing by fluid energy}
15/14	. Edge runners, e.g. Chile mills	17/1865	. . . . . {after crushing}
2015/143	. . {each runner pivot carrying more than one runner}	17/187	. . . . . {with recirculation of material to crushing zone}
2015/146	. . {Step-shaped runners}	17/1875	. . . . . {passing gas through crushing zone}
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	17/188	. . . . . {characterised by point of gas entry or exit or by gas flow path}
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)	17/1885	. . . . . {the applied gas acting to effect material separation (B02C 17/1895 takes precedence)}
17/002	. {with rotary cutting or beating elements}	17/189	. . . . . {with return of oversize material to crushing zone (B02C 17/1895 takes precedence)}
17/005	. {the charge being turned over by magnetic forces}	17/1895	. . . . . {gas being recirculated to crushing zone}
17/007	. {specially adapted for disintegrating refuse}	17/20	. . Disintegrating members
17/02	. with perforated container	17/205	. . . {Adding disintegrating members to the tumbling mill}
17/04	. with unperforated container	17/22	. . Lining for containers
17/06	. . with several compartments	17/225	. . . {using rubber or elastomeric material}
2017/065	. . . {with several compartments in the form of multiwell blocks}	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}	2018/168	. . . {User safety devices or measures in shredders}
2018/0023	. . {Switching devices}	18/18	. . . Knives; Mountings thereof
2018/003	. . {Removing clips, pins or staples before disintegrating}	18/182	. . . . {Disc-shaped knives}
2018/0038	. . {Motor drives}	18/184	. . . . . {with peripherally arranged demountable cutting tips or elements}
2018/0046	. . {Shape or construction of frames, housings or casings}	18/186	. . . . . {Axially elongated knives}
2018/0053	. . {hand-operated}	2018/188	. . . . {Stationary counter-knives; Mountings thereof}
2018/0061	. . {with compacting devices for the disintegrated material}	18/20	. . . . . Sickle-shaped knives
2018/0069	. . {with stripping devices}	18/22	. . . . . Feed or discharge means
18/0076	. {with cutting or tearing members fixed on endless flexible members (without cutting or tearing members B02C 19/0006)}	2018/2208	. . . . . {for weblike material}
18/0084	. {specially adapted for disintegrating garbage, waste or sewage}	18/2216	. . . . . {Discharge means}
18/0092	. . {for waste water or for garbage}	18/2225	. . . . . {Feed means}
18/02	. with reciprocating knives	18/2233	. . . . . {of ram or pusher type}
18/04	. . Details	18/2241	. . . . . {of conveyor belt type (B02C 18/225 takes precedence)}
18/06	. with rotating knives	18/225	. . . . . {of conveyor belt and cooperating roller type}
18/062	. . {with rotor elements extending axially in close radial proximity of a concentrically arranged slotted or perforated ring}	18/2258	. . . . . {of screw type}
18/065	. . {within rotatable bowls, e.g. meat cutters}	18/2266	. . . . . {of revolving drum type}
18/067	. . {Tub-grinders}	18/2275	. . . . . {using a rotating arm}
18/08	. . within vertical containers {(B02C 18/062 , B02C 18/065 take precedence)}	18/2283	. . . . . {using rollers (B02C 18/225 takes precedence)}
18/083	. . . {with a disc rotor having generally radially extending slots or openings bordered with cutting knives}	18/2291	. . . . . {Feed chute arrangements}
18/086	. . . {specially adapted for disintegrating plastics, e.g. cinematographic films (for plastic bottles B02C 19/0093 , disintegrating plastics B29B 17/00)}	18/24	. . . Drives
18/10	. . . with drive arranged above container {(B02C 18/083 takes precedence)}	18/26	. with knives which both reciprocate and rotate
18/12	. . . with drive arranged below container {(B02C 18/083 takes precedence)}	18/28	. with spiked cylinders
18/14	. . within horizontal containers {(B02C 18/062 , B02C 18/065 take precedence)}	18/30	. Mincing machines with perforated discs and feeding worms
18/141	. . . {with axial flow}	18/301	. . {with horizontal axis}
18/142	. . . {with two or more inter-engaging rotatable cutter assemblies}	18/302	. . . {with a knife-perforated disc unit}
18/143	. . . {with a disc rotor having generally radially extending slots or openings bordered with cutting knives}	18/304	. . . {with several axially aligned knife-perforated disc units}
18/144	. . . {with axially elongated knives}	18/305	. . {Details}
18/145	. . . {with knives spaced axially and circumferentially on the periphery of a cylindrical rotor unit}	2018/307	. . . {Cooling arrangements in mincing machines}
18/146	. . . {with a rotor comprising a plurality of axially contiguous disc-like segments each having at least one radially extending cutting element}	2018/308	. . {with separating devices for hard material, e.g. bone}
2018/147	. . . {of the plural stage type}	18/32	. . with sharpening devices
18/148	. . . {specially adapted for disintegrating plastics, e.g. cinematographic films (for plastic bottles B02C 19/0093 , disintegrating plastics B29B 17/00)}	18/34	. . with means for cleaning the perforated discs
18/16	. . Details	18/36	. . Knives or perforated discs
2018/162	. . . {Shape or inner surface of shredder-housings}	18/362	. . . {Knives}
2018/164	. . . {Prevention of jamming and/or overload}	18/365	. . . {Perforated discs}
2018/166	. . . {Lubricating the knives of the cutting mechanisms}	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)}	23/02	. Feeding devices (for grain mills B02C 11/04 ; for roller mills B02C 4/286); transport devices in general B65G)
19/005	. . {the materials to be pulverised being disintegrated by collision of, or friction between, the material particles (jet mills B02C 19/06)}	23/04	. Safety devices (in general F16P {; for rotary mills B02C 13/31 })
19/0056	. {specially adapted for specific materials not otherwise provided for}	23/06	. Selection or use of additives to aid disintegrating
19/0062	. . {specially adapted for shredding scrap metal, e.g. automobile bodies}	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 })
19/0068	. . {specially adapted for breaking-up fluorescent tubes}	23/10	. . with separator arranged in discharge path of crushing or disintegrating zone
19/0075	. . {specially adapted for disintegrating medical waste (disposal of medical waste B09B 3/0075 , sterilisation of refuse A61L 11/00)}	23/12	. . . with return of oversize material to crushing or disintegrating zone
19/0081	. . {specially adapted for breaking-up bottles}	23/14	. . with more than one separator
19/0087	. . . {for glass bottles}	23/16	. . with separator defining termination of crushing or disintegrating zone, e.g. screen denying egress of oversize material
19/0093	. . . {for plastic bottles}		
19/06	. Jet mills		
19/061	. . {of the cylindrical type (B02C 19/068 takes precedence)}	2023/165	. . . {Screen denying egress of oversize material}
19/063	. . {of the toroidal type (B02C 19/068 takes precedence)}	23/18	. Adding fluid, other than for crushing or disintegrating by fluid energy (for tumbling mills B02C 17/186 ; feeding devices B02C 23/02)
19/065	. . {of the opposed-jet type (B02C 19/068 takes precedence)}	23/20	. . after crushing or disintegrating
19/066	. . {of the jet-anvil type (B02C 19/068 takes precedence)}	23/22	. . . with recirculation of material to crushing or disintegrating zone
19/068	. . {of the fluidised-bed type}	23/24	. . Passing gas through crushing or disintegrating zone (B02C 15/001 , B02C 23/38 , B02C 23/40 take precedence)
19/08	. Pestle and mortar		
19/10	. Mills in which a friction block is towed along the surface of a cylindrical or annular member	23/26	. . . characterised by point of gas entry or exit or by gas flow path
19/11	. High-speed drum mills (for separating B04B)	23/28	. . . gas moving means being integral with, or attached to, crushing or disintegrating element
19/16	. Mills provided with vibrators (roller mills B02C 4/423 ; tumbling mills B02C 17/14)	23/30	. . . the applied gas acting to effect material separation (B02C 23/34 takes precedence)
19/18	. Use of auxiliary physical effects, e.g. ultrasonics, irradiation, for disintegrating	23/32	. . . with return of oversize material to crushing or disintegrating zone (B02C 23/34 takes precedence)
2019/183	. . {Crushing by discharge of high electrical energy}	23/34	. . . gas being recirculated to crushing or disintegrating zone
19/186	. . {Use of cold or heat for disintegrating (B02C 4/44 , B02C 7/17 , B02C 11/08 take precedence)}	23/36	. . the crushing or disintegrating zone being submerged in liquid
19/20	. Disintegrating by grating (domestic food grating devices A47J 43/25)}	23/38	. . in apparatus having multiple crushing or disintegrating zones
19/22	. Crushing mills with screw-shaped crushing means	23/40	. . with more than one means for adding fluid to the material being crushed or disintegrated
21/00	Disintegrating plant with or without drying of the material (for grain B02C 9/04)	25/00	Control arrangements specially adapted for crushing or disintegrating
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}	2201/00	Codes relating to disintegrating devices adapted for specific materials
21/02	. Transportable disintegrating plant	2201/02	. for reinforced concrete
2021/023	. . {for disintegrating material on the surface of the ground}	2201/04	. for used tyres
21/026	. . {self-propelled}	2201/06	. for garbage, waste or sewage
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)	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