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	2/10	• concentrically moved; Bell crushers
1/005 1/02 1/025 1/04	 members {hydraulically or pneumatically operated} Jaw crushers or pulverisers {Jaw clearance or overload control} with single-acting jaws 	4/00	Crushing or disintegrating by roller mills (with milling members in the form of rollers or balls co- operating with rings or discs <u>B02C 15/00</u> ; roller mills or roll refiners exclusively for chocolate <u>A23G 1/10</u> , A23G 1/12)
1/043	• • • {with cooperating single acting jaws}	4/02	• with two or more rollers
1/046 1/06	 {of the plural stage type}. with double-acting jaws	4/04	• specially adapted for milling paste-like material, e.g. paint, chocolate, colloids
1/08	• • with jaws coacting with rotating roller	4/06	• specially adapted for milling grain
1/10 1/12	Shape or construction of jawsMills with non-rotating spiked members	4/08	• • with co-operating corrugated or toothed crushing- rollers
1/14	Stamping mills	4/10	• with a roller co-operating with a stationary member
2/00	Crushing or disintegrating by gyratory or cone	4/12	• • in the form of a plate
2/00	crushers {(with non-coaxial discs with intersecting axes <u>B02C 7/005</u>)}	4/14	• • specially adapted for milling paste-like material, e.g. paint, chocolate, colloids
2002/002	• {the bowl being a driven element for providing a	4/16	specially adapted for milling grain
2002,002	crushing effect}	4/18	• • in the form of a bar
2/005	• {Lining}	4/20	• • • wherein the roller is corrugated or toothed
2/007 2/02	{Feeding devices}eccentrically moved	4/22	• • • specially adapted for milling paste-like material, e.g. paint, chocolate, colloids
2/02	with vertical axis	4/24	specially adapted for milling grain
2/042	• • {Moved by an eccentric weight}	4/26	• • in the form of a grid or grating
2/045	• • • {and with bowl adjusting or controlling	4/28	• Details
	mechanisms (<u>B02C 2/042</u> , <u>B02C 2/06</u> take	4/283	• • {Lateral sealing shields}
	precedence)}	4/286	• • {Feeding devices}
2/047	• • • {and with head adjusting or controlling	4/30	Shape or construction of rollers
	mechanisms (B02C 2/042, B02C 2/06 take	4/305	• • • {Wear resistant rollers}
	precedence)}	4/32	• • Adjusting, applying pressure to, or controlling the
2/06	• • • and with top bearing $\{(\underline{B02C 2/042} \text{ takes})\}$		distance between, milling members
	precedence)}	4/34	• • • in mills wherein a roller co-operates with a
2/08	• • with horizontal axis		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
7/02	intersecting axes}
7/02	• with coaxial discs
7/04	• with concentric circles of intermeshing teeth
7/06	• with horizontal axis (<u>B02C 7/04</u> 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
- (1 -	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}
7/182	 • {with horizontal axis} • {with vertical axis}
7/184	 {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,
11/00	devices therefor <u>A62C</u>)
11/08	• Cooling, heating, ventilating, conditioning
	with respect to temperature or water content (conditioning grain before milling <u>B02B 1/08</u> ; air-
	conditioning or ventilating in general <u>F24F</u>)
13/00	Disintegrating by mills having rotary beater
	elements {; Hammer mills}
13/02	 with horizontal rotor shaft (with axial flow <u>B02C 13/10</u>)
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
	<u>B02C 13/1807</u>)}
13/095	

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 <u>B02C 13/09</u>; centrifugal acceleration of material through radially extending channels <u>B02C 19/0025</u>; centrifugal acceleration of material by means of an open top rotor <u>B02C 19/0031</u>)}
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	
2013/28627	
2013/28636	
2013/28645	•••• {of conveyor belt and cooperating roller type}
2013/28654	• • • • {of screw type}
2013/28663	• • • • {using rollers}
2013/28672	e ,
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	Oriving mechanisms
13/31	Safety devices or measures
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15/00	Disintegrating by milling members in the form of rollers or balls co-operating with rings or discs {(high-speed drum mills <u>B02C 19/11)</u> }
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
	<u>B02C 15/04</u>)}
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 (<u>B02C 15/04</u> 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 (<u>B02C 15/02</u> 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 <u>B02C 19/11</u> {; drums for polishing or grinding
	<u>B24B</u> })
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 <u>B02C 19/16</u>)}
17/16	 Mills in which a fixed container houses stirring
17/10	means tumbling the charge
17/161	• {Arrangements for separating milling media and
17/101	ground material }
17/163	• {Stirring means}
2017/165	 {simily means} {with stirring means comprising more than one
2017/105	agitator}
17/166	• {of the annular gap type}
17/168	• {with a basket media milling device arranged
17/100	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	 (Dearing spectrally adapted for tanioning mins) (Cooling or heating devices)
17/1813	 . {Lids}
17/1825	{Lifting devices (lifting devices associated with
17/1025	the lining for containers $B02C 17/22$)
17/183	• {Feeding or discharging devices}
17/1835	 (Discharging devices) (Discharging devices combined with sorting
17/1055	or separating of material (<u>B02C 17/186</u> takes
	precedence)}
17/184	• • • { with separator arranged in discharge path of
1,,101	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 (<u>B02C 17/1895</u> takes
	precedence)}
17/189	•••• {with return of oversize material to
	crushing zone (<u>B02C 17/1895</u> takes
	precedence)}
17/1895	• • • • {gas being recirculated to crushing zone}
17/20	Disintegrating members
17/205	• • • {Adding disintegrating members to the
15/22	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
20,00	tearing members which chop material into
	fragments {(tree stump comminutors <u>A01G 23/067</u>)}
10/0007	
18/0007	• {specially adapted for disintegrating documents}

2018/0015	• • {for disintegrating CDs, DVDs and/or credit
2018/0022	cards}
2018/0023 2018/003	 . {Switching devices} . {Removing clips, pins or staples before
2018/005	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
2010/00/00	material }
2018/0069	• {with stripping devices}
18/0076	 {with cutting or tearing members fixed on endless flexible members (without cutting or tearing members <u>B02C 19/0006</u>)}
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 { $(B02C 18/062, B02C 18/06$
10/002	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 <u>B02C 19/0093</u>, disintegrating plastics <u>B29B 17/00</u>)}
18/10	• • • with drive arranged above container {(<u>B02C 18/083</u> takes precedence)}
18/12	• • • with drive arranged below container {(<u>B02C 18/083</u> takes precedence)}
18/14	• within horizontal containers {(<u>B02C 18/062</u> ,
	B02C 18/065 take precedence)}
18/141	• • • {with axial flow}
18/142	• • • { with two or more inter-engaging rotatable
10/142	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 <u>B02C 19/0093</u>, disintegrating plastics <u>B29B 17/00</u>)}
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}
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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
18/20	Feed or discharge means
2018/2208	•••• { for weblike material }
18/2216	••••••••••••••••••••••••••••••••••••••
18/2225	• • • {Feed means}
18/2233	• • • • {of ram or pusher type}
18/2241	• • • • {of conveyor belt type (<u>B02C 18/225</u> 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 ($\underline{B02C \ 18/225}$ 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 <u>B02C 18/0076</u>)}
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 <u>B02C 13/09</u>, <u>B02C 13/1807</u>)}
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 <u>B02C 19/06</u>)}
19/005	• • {the materials to be pulverised being disintegrated
	by collision of, or friction between, the material
	particles (jet mills <u>B02C 19/06</u>)}
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 <u>B09B 3/00</u>)}
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 (<u>B02C 19/068</u> takes
197001	precedence)}
19/063	• {of the toroidal type (<u>B02C 19/068</u> takes
19/005	precedence)}
19/065	• {of the opposed-jet type (<u>B02C 19/068</u> takes
197000	precedence)}
19/066	• {of the jet-anvil type (<u>B02C 19/068</u> takes
19/000	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
1)/10	surface of a cylindrical or annular member
19/11	• High-speed drum mills (for separating <u>B04B</u>)
19/16	• Mills provided with vibrators ({roller mills
17/10	BO2C $4/423$; tumbling mills BO2C $17/14$)
19/18	• Use of auxiliary physical effects, e.g. ultrasonics,
19/10	irradiation, for disintegrating
2019/183	• {Crushing by discharge of high electrical energy}
19/186	• {Use of cold or heat for disintegrating
17/100	(<u>B02C 4/44</u> , <u>B02C 7/17</u> , <u>B02C 11/08</u> take
	precedence)}
19/20	Disintegrating by grating {(domestic food grating
19/20	devices <u>A47J 43/25</u>)}
19/22	• Crushing mills with screw-shaped crushing means
1)/22	č i č
21/00	Disintegrating plant with or without drying of the
	material (for grain <u>B02C 9/04</u>)
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
23/00	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 <u>B02C 11/00;</u> } separating or
	sorting in general $\underline{B03}$, $\underline{B04}$, $\underline{B07}$)
	<u> </u>

23/02	• Feeding devices ({for grain mills <u>B02C 11/04;</u> for roller mills <u>B02C 4/286</u> }; transport devices in general <u>B65G</u>)
23/04	• Safety devices (in general <u>F16P</u> {; for rotary mills <u>B02C 13/31</u> })
23/06	• Selection or use of additives to aid disintegrating
23/08	• Separating or sorting of material, associated with crushing or disintegrating (<u>B02C 23/18</u> takes precedence {; beater mills combined with sifting devices <u>B02C 13/13</u> , <u>B02C 13/14</u> ; for tumbling mills <u>B02C 17/1835</u> })
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 <u>B02C 17/186;</u> } feeding devices <u>B02C 23/02</u>)
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 (<u>{B02C 15/001</u>}, <u>B02C 23/38</u>, <u>B02C 23/40</u> 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 (<u>B02C 23/34</u> takes precedence)
23/32	• • • with return of oversize material to crushing or disintegrating zone (<u>B02C 23/34</u> 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
2201/065	for waste water of sewage for garden waste
2201/000	• • 101 guiden 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