Symbol	Typ	Titel
B	**Sektion**	**SECTION B — PERFORMING OPERATIONS; TRANSPORTING**
B21	**Untersektion**	**SHAPING**
B21	**Klasse**	**MECHANICAL METAL-WORKING WITHOUT ESSENTIALLY REMOVING MATERIAL; PUNCHING METAL (casting, powder metallurgy B22; shearing B23D; working of metal by the action of a high concentration of electric current B23H; soldering, welding, flame-cutting B23K; other working of metal B23P; punching sheet material in general B26F; processes for changing of physical properties of metals C21D, C22F; electroforming C25D 1/00)**
B21B	**Unterklasse**	**ROLLING OF METAL (auxiliary operations used in connection with metal-working operations covered in B21, see B21C; bending by rolling B21D; manufacture of particular objects, e.g. screws, wheels, rings, barrels, balls, by rolling B21H; pressure welding by means of a rolling mill B23K 20/04)**
B21B 1/00	**Hauptgruppe**	**Metal rolling methods or mills for making semi-finished products of solid or profiled cross-section (B21B 17/00-B21B 23/00 take precedence; with respect to composition of material to be rolled B21B 3/00; extending closed shapes of metal bands by simultaneous rolling at two or more zones B21B 5/00; metal-rolling stands as units B21B 13/00; continuous casting into moulds having walls formed by moving rolls B22D 11/06); Sequence of operations in milling trains; Layout of rolling-mill plant, e.g. grouping of stands; Succession of passes or of sectional pass alternations**
B21B 1/02	1-Punkt Untergruppe	. for rolling heavy work, e.g. ingots, slabs, billets, in which the cross-sectional form is unimportant
B21B 1/04	2-Punkt Untergruppe	. . in a continuous process
B21B 1/06	2-Punkt Untergruppe	. . in a non-continuous process
B21B 1/08	*1-Punkt Untergruppe*	*. for rolling work of special cross-section, e.g. angle steel (rolling metal of indefinite length in repetitive shapes specially designed for the manufacture of particular objects B21H 8/00) [1, 2006.01]*
B21B 1/082	*2-Punkt Untergruppe*	*. . Piling sections having lateral edges specially adapted for interlocking with each other in order to build a wall [2006.01]*
B21B 1/085	*2-Punkt Untergruppe*	*. . Rail sections [2006.01]*
B21B 1/088	*2-Punkt Untergruppe*	*. . H- or I-sections [2006.01]*
B21B 1/09	*2-Punkt Untergruppe*	*. . L-sections [2006.01]*
B21B 1/092	*2-Punkt Untergruppe*	*. . T-sections [2006.01]*
B21B 1/095	*2-Punkt Untergruppe*	*. . U- or channel sections [2006.01]*
B21B 1/098	*2-Punkt Untergruppe*	*. . Z-sections [2006.01]*
B21B 1/10	2-Punkt Untergruppe	. . in a single two-high or universal rolling mill
B21B 1/12	2-Punkt Untergruppe	. . in a continuous process
B21B 1/14	2-Punkt Untergruppe	. . in a non-continuous process
B21B 1/16	1-Punkt Untergruppe	. for rolling wire or material of like small cross-section
B21B 1/18	2-Punkt Untergruppe	. . in a continuous process
B21B 1/20	2-Punkt Untergruppe	. . in a non-continuous process
B21B 1/22	1-Punkt Untergruppe	. for rolling bands or sheets of indefinite length (B21B 1/42 takes precedence)
B21B 1/24	2-Punkt Untergruppe	. . in a continuous process

Symbol	Typ	Titel
B21B 1/26	3-Punkt Untergruppe	. . . by hot-rolling
B21B 1/28	3-Punkt Untergruppe	. . . by cold-rolling
B21B 1/30	2-Punkt Untergruppe	. . in a non-continuous process
B21B 1/32	3-Punkt Untergruppe	. . . in reversing mills, e.g. with intermediate storage reels for accumulating work
B21B 1/34	4-Punkt Untergruppe	. . . . by hot-rolling
B21B 1/36	4-Punkt Untergruppe	. . . . by cold-rolling
B21B 1/38	1-Punkt Untergruppe	. for rolling sheets of limited length, e.g. folded sheets, superimposed sheets (B21B 1/40 takes precedence; folding sheets before, or separating layers after, rolling B21B 47/00) [2]
B21B 1/40	1-Punkt Untergruppe	. for rolling foils which present special problems, e.g. because of thinness
B21B 1/42	1-Punkt Untergruppe	. for step-by-step or planetary rolling (making tubes by pilgrim-step rolling B21B 21/00)
B21B 1/46	1-Punkt Untergruppe	. for rolling metal immediately subsequent to continuous casting (metal-rolling stands B21B 13/22; continuous casting B22D 11/00, e.g. into moulds with rolls B22D 11/06) [3]
B21B 3/00	**Hauptgruppe**	**Rolling materials of special alloys so far as the composition of the alloy requires or permits special rolling methods or sequences (altering special metallurgical properties of alloys, other than structure consolidation or mechanical properties resulting therefrom C21D, C22F)**
B21B 3/02	1-Punkt Untergruppe	. Rolling special iron alloys
B21B 5/00	**Hauptgruppe**	**Extending closed shapes of metal bands by rolling (manufacture of circular shapes, e.g. wheel rims, B21H 1/06)**
B21B 9/00	**Hauptgruppe**	**Measures for carrying out rolling operations under special conditions, e.g. in vacuum or inert atmosphere to prevent oxidation of work; Special measures for removing fumes from rolling mills**
B21B 11/00	**Hauptgruppe**	**Subsidising the rolling processes by subjecting rollers or work to vibrations**
B21B 13/00	**Hauptgruppe**	**Metal-rolling stands, i.e. an assembly composed of a stand frame, rolls, and accessories (B21B 17/00-B21B 23/00 take precedence; details, component parts, accessories, auxiliary means, procedures in connection with metal rolling, see the relevant groups)**
B21B 13/02	1-Punkt Untergruppe	. with axes of rolls arranged horizontally
B21B 13/04	2-Punkt Untergruppe	. . Three-high arrangement
B21B 13/06	1-Punkt Untergruppe	. with axes of rolls arranged vertically
B21B 13/08	1-Punkt Untergruppe	. with differently-directed roll axes, e.g. for the so-called "universal" rolling process
B21B 13/10	2-Punkt Untergruppe	. . all axes being arranged in one plane
B21B 13/12	2-Punkt Untergruppe	. . axes being arranged in different planes
B21B 13/14	1-Punkt Untergruppe	. having counter-pressure devices acting on rolls to inhibit deflection of same under load (counter-pressure devices as such B21B 29/00)
B21B 13/16	1-Punkt Untergruppe	. with alternatively operative rolls
B21B 13/18	1-Punkt Untergruppe	. for step-by-step or planetary rolling (methods B21B 1/42; making tubes by pilgrim-step rolling B21B 21/00)
B21B 13/20	2-Punkt Untergruppe	. . for planetary rolling
B21B 13/22	1-Punkt Untergruppe	. for rolling metal immediately subsequent to continuous casting (methods therefor B21B 1/46; continuous casting B22D 11/00, e.g. into moulds with rolls B22D 11/06)
B21B 15/00	**Hauptgruppe**	**Arrangements for performing additional metal-working operations specially combined with or arranged in, or specially adapted for use in connection with, metal-rolling mills**

Symbol	Typ	Titel
B21B 15/02	1-Punkt Untergruppe	. in which work is subjected to permanent internal twisting, e.g. for producing reinforcement bars for concrete
		Rolling methods or mills specially designed for making or processing tubes (control of tube rolling B21B 37/78)
B21B 17/00	**Hauptgruppe**	**Tube-rolling by rollers of which the axes are arranged essentially perpendicular to the axis of the work, e.g. "axial" tube-rolling**
B21B 17/02	1-Punkt Untergruppe	. with mandrel (B21B 17/08 takes precedence) [2]
B21B 17/04	2-Punkt Untergruppe	. . in a continuous process
B21B 17/06	2-Punkt Untergruppe	. . in a discontinuous process
B21B 17/08	1-Punkt Untergruppe	. with mandrel having one or more protrusions [2]
B21B 17/10	2-Punkt Untergruppe	. . in a continuous process
B21B 17/12	2-Punkt Untergruppe	. . in a discontinuous process
B21B 17/14	1-Punkt Untergruppe	. without mandrel
B21B 19/00	**Hauptgruppe**	**Tube-rolling by rollers arranged outside the work and having their axes not perpendicular to the axis of the work (straightening by rollers B21D)**
B21B 19/02	1-Punkt Untergruppe	. the axes of the rollers being arranged essentially diagonally to the axis of the work, e.g. "cross" tube-rolling
B21B 19/04	2-Punkt Untergruppe	. . Rolling basic material of solid, i.e. non-hollow, structure; Piercing
B21B 19/06	2-Punkt Untergruppe	. . Rolling hollow basic material (B21B 19/04 takes precedence; separating work from mandrel B21C 45/00)
B21B 19/08	3-Punkt Untergruppe	. . . Enlarging tube diameter
B21B 19/10	3-Punkt Untergruppe	. . . Finishing, e.g. smoothing, sizing
B21B 19/12	1-Punkt Untergruppe	. the axes of the rollers being arranged essentially parallel to the axis of the work
B21B 19/14	2-Punkt Untergruppe	. . Rolling tubes by means of additional rollers arranged inside the tubes
B21B 19/16	2-Punkt Untergruppe	. . Rolling tubes without additional rollers arranged inside the tubes
B21B 21/00	**Hauptgruppe**	**Pilgrim-step tube-rolling**
B21B 21/02	1-Punkt Untergruppe	. Rollers therefor
B21B 21/04	1-Punkt Untergruppe	. Pilgrim-step feeding mechanisms (B21B 21/06 takes precedence)
B21B 21/06	1-Punkt Untergruppe	. Devices for revolving work between the steps
B21B 23/00	**Hauptgruppe**	**Tube-rolling not restricted to methods provided for in only one of groups B21B 17/00-B21B 21/00, e.g. combined processes (B21B 25/00 takes precedence)**
B21B 25/00	**Hauptgruppe**	**Mandrels for metal tube rolling mills, e.g. mandrels of the types used in the methods covered by group B21B 17/00; Accessories or auxiliary means therefor**
B21B 25/02	1-Punkt Untergruppe	. Guides, supports, or abutments for mandrels, e.g. carriages; Adjusting devices for mandrels
B21B 25/04	1-Punkt Untergruppe	. Cooling or lubricating mandrels during operation [2]
B21B 25/06	1-Punkt Untergruppe	. Interchanging mandrels
B21B 27/00	**Hauptgruppe**	**Rolls (shape of working surfaces required by special processes B21B 1/00); Lubricating, cooling or heating rolls while in use**
B21B 27/02	1-Punkt Untergruppe	. Shape or construction of rolls (for rolling metal of indefinite length in repetitive shapes specially designed for the manufacture of particular objects B21H 8/02)
B21B 27/03	2-Punkt Untergruppe	. . Sleeved rolls [5]

Symbol	Typ	Titel
B21B 27/05	3-Punkt Untergruppe	. . . with deflectable sleeves [5]
B21B 27/06	1-Punkt Untergruppe	. Lubricating, cooling, or heating rolls
B21B 27/08	2-Punkt Untergruppe	. . internally
B21B 27/10	2-Punkt Untergruppe	. . externally
B21B 28/00	**Hauptgruppe**	**Maintaining rolls or rolling equipment in effective condition (lubricating, cooling or heating rolls while in use B21B 27/06) [2]**
B21B 28/02	1-Punkt Untergruppe	. Maintaining rolls in effective condition, e.g. reconditioning [2]
B21B 28/04	2-Punkt Untergruppe	. . while in use, e.g. polishing [2]
B21B 29/00	**Hauptgruppe**	**Counter-pressure devices acting on rolls to inhibit deflection of same under load, e.g. backing rolls**
B21B 31/00	**Hauptgruppe**	**Rolling stand structures; Mounting, adjusting, or interchanging rolls, roll mountings, or stand frames**
B21B 31/02	1-Punkt Untergruppe	. Rolling stand frames; Roll mountings
B21B 31/04	2-Punkt Untergruppe	. . with tie rods, e.g. prestressed tie rods
B21B 31/06	2-Punkt Untergruppe	. . Fastening stands or frames to foundation, e.g. to the sole plate (in general F16M)
B21B 31/07	1-Punkt Untergruppe	. Adaptation of roll bearings (bearings in general F16C) [2]
B21B 31/08	1-Punkt Untergruppe	. Interchanging rolls, roll mountings, or stand frames [2]
B21B 31/10	2-Punkt Untergruppe	. . by horizontally displacing
B21B 31/12	2-Punkt Untergruppe	. . by vertically displacing
B21B 31/14	2-Punkt Untergruppe	. . by pivotally displacing
B21B 31/16	1-Punkt Untergruppe	. Adjusting rolls (control devices B21B 37/00)
B21B 31/18	2-Punkt Untergruppe	. . by moving rolls axially
B21B 31/20	2-Punkt Untergruppe	. . by moving rolls perpendicularly to roll axis
B21B 31/22	3-Punkt Untergruppe	. . . mechanically
B21B 31/24	4-Punkt Untergruppe	. . . . by screws
B21B 31/26	4-Punkt Untergruppe	. . . . Adjusting eccentrically-mounted roll bearings
B21B 31/28	4-Punkt Untergruppe	. . . . by toggle-lever mechanisms
B21B 31/30	4-Punkt Untergruppe	. . . . by wedges or their equivalent
B21B 31/32	3-Punkt Untergruppe	. . . by liquid pressure
B21B 33/00	**Hauptgruppe**	**Safety devices not otherwise provided for (safety devices in general F16P); Breaker blocks; Devices for freeing jammed rolls [2]**
B21B 33/02	1-Punkt Untergruppe	. Preventing fracture of rolls [2]
B21B 35/00	**Hauptgruppe**	**Drives for metal-rolling mills**
B21B 35/02	1-Punkt Untergruppe	. for continuously-operating mills (B21B 35/10, B21B 35/12 take precedence)
B21B 35/04	2-Punkt Untergruppe	. . each stand having its own motor or motors
B21B 35/06	1-Punkt Untergruppe	. for non-continuously-operating mills or for single stands (B21B 35/10, B21B 35/12 take precedence)

Symbol	Typ	Titel
B21B 35/08	2-Punkt Untergruppe	. . for reversing rolling mills
B21B 35/10	1-Punkt Untergruppe	. Driving arrangements for rolls which have only a low-power drive; Driving arrangements for rolls which receive power from the shaft of another roll [2]
B21B 35/12	1-Punkt Untergruppe	. Toothed-wheel gearings specially adapted for metal-rolling mills; Housings or mountings therefor
B21B 35/14	1-Punkt Untergruppe	. Couplings, driving spindles, or spindle carriers specially adapted for or specially arranged in metal-rolling mills (couplings or shafts in general F16)
B21B 37/00	**Hauptgruppe**	**Control devices or methods specially adapted for metal-rolling mills or the work produced thereby (methods or devices for measuring specially adapted for metal-rolling mills B21B 38/00)**
B21B 37/16	1-Punkt Untergruppe	. Control of thickness, width, diameter or other transverse dimensions (B21B 37/58 takes precedence) [6]
B21B 37/18	2-Punkt Untergruppe	. . Automatic gauge control [6]
B21B 37/20	3-Punkt Untergruppe	. . . in tandem mills [6]
B21B 37/22	2-Punkt Untergruppe	. . Lateral spread control; Width control, e.g. by edge rolling [6]
B21B 37/24	2-Punkt Untergruppe	. . Automatic variation of thickness according to a predetermined programme [6]
B21B 37/26	3-Punkt Untergruppe	. . . for obtaining one strip having successive lengths of different constant thickness [6]
B21B 37/28	1-Punkt Untergruppe	. Control of flatness or profile during rolling of strip, sheets or plates [6]
B21B 37/30	2-Punkt Untergruppe	. . using roll camber control [6]
B21B 37/32	3-Punkt Untergruppe	. . . by cooling, heating or lubricating the rolls [6]
B21B 37/34	3-Punkt Untergruppe	. . . by hydraulic expansion of the rolls [6]
B21B 37/36	3-Punkt Untergruppe	. . . by radial displacement of the roll sleeve on a stationary roll beam by means of hydraulic supports [6]
B21B 37/38	2-Punkt Untergruppe	. . using roll bending (B21B 37/42 takes precedence) [6]
B21B 37/40	2-Punkt Untergruppe	. . using axial shifting of the rolls (B21B 37/42 takes precedence) [6]
B21B 37/42	2-Punkt Untergruppe	. . using a combination of roll bending and axial shifting of the rolls [6]
B21B 37/44	2-Punkt Untergruppe	. . using heating, lubricating or water-spray cooling of the product [6]
B21B 37/46	1-Punkt Untergruppe	. Roll speed or drive motor control (B21B 37/52, B21B 37/60 take precedence) [6]
B21B 37/48	1-Punkt Untergruppe	. Tension control; Compression control [6]
B21B 37/50	2-Punkt Untergruppe	. . by looper control [6]
B21B 37/52	2-Punkt Untergruppe	. . by drive motor control [6]
B21B 37/54	3-Punkt Untergruppe	. . . including coiler drive control, e.g. reversing mills [6]
B21B 37/56	1-Punkt Untergruppe	. Elongation control [6]
B21B 37/58	1-Punkt Untergruppe	. Roll-force control; Roll-gap control [6]
B21B 37/60	2-Punkt Untergruppe	. . by control of a motor which drives an adjusting screw [6]
B21B 37/62	2-Punkt Untergruppe	. . by control of a hydraulic adjusting device [6]
B21B 37/64	2-Punkt Untergruppe	. . Mill spring or roll spring compensation systems, e.g. control of prestressed mill stands [6]
B21B 37/66	2-Punkt Untergruppe	. . Roll eccentricity compensation systems [6]

Symbol	Typ	Titel
B21B 37/68	1-Punkt Untergruppe	. Camber or steering control for strip, sheets or plates, e.g. preventing meandering [6]
B21B 37/70	1-Punkt Untergruppe	. Length control (B21B 37/56 takes precedence) [6]
B21B 37/72	1-Punkt Untergruppe	. Rear end control; Front end control [6]
B21B 37/74	1-Punkt Untergruppe	. Temperature control, e.g. by cooling or heating the rolls or the product (B21B 37/32, B21B 37/44 take precedence) [6]
B21B 37/76	2-Punkt Untergruppe	. . Cooling control on the run-out table [6]
B21B 37/78	1-Punkt Untergruppe	. Control of tube rolling [6]
B21B 38/00	**Hauptgruppe**	**Methods or devices for measuring specially adapted for metal-rolling mills, e.g. position detection, inspection of the product [6]**
B21B 38/02	1-Punkt Untergruppe	. for measuring flatness or profile of strips [6]
B21B 38/04	1-Punkt Untergruppe	. for measuring thickness, width, diameter or other transverse dimensions of the product [6]
B21B 38/06	1-Punkt Untergruppe	. for measuring tension or compression [6]
B21B 38/08	1-Punkt Untergruppe	. for measuring roll-force [6]
B21B 38/10	1-Punkt Untergruppe	. for measuring roll-gap, e.g. pass indicators [6]
B21B 38/12	1-Punkt Untergruppe	. for measuring roll camber [6]
B21B 39/00	**Hauptgruppe**	**Arrangements for moving, supporting, or positioning work, or controlling its movement, combined with or arranged in, or specially adapted for use in connection with, metal-rolling mills (guiding, conveying, or accumulating easily-flexible work in loops or curves B21B 41/00; specially associated with cooling-beds B21B 43/00; conveying or transporting in general B65G)**
B21B 39/02	1-Punkt Untergruppe	. Feeding or supporting work; Braking or tensioning arrangements
B21B 39/04	2-Punkt Untergruppe	. . Lifting or lowering work for conveying purposes, e.g. tilting tables arranged immediately in front of or behind the pass (turn-over or like manipulating means as such B21B 39/20)
B21B 39/06	2-Punkt Untergruppe	. . Pushing or forcing work into pass
B21B 39/08	2-Punkt Untergruppe	. . Braking or tensioning arrangements
B21B 39/10	2-Punkt Untergruppe	. . Arrangement or installation of feeding rollers in rolling stands
B21B 39/12	2-Punkt Untergruppe	. . Arrangement or installation of roller tables in relation to a roll stand
B21B 39/14	1-Punkt Untergruppe	. Guiding, positioning or aligning work (B21B 43/12 takes precedence; guides in which work is subjected to permanent internal twisting B21B 15/02)
B21B 39/16	2-Punkt Untergruppe	. . immediately before entering or after leaving the pass
B21B 39/18	2-Punkt Untergruppe	. . Switches for directing work in metal-rolling mills or trains
B21B 39/20	1-Punkt Untergruppe	. Revolving, turning-over, or like manipulation of work (guides in which work is subjected to permanent internal twisting B21B 15/02)
B21B 39/22	2-Punkt Untergruppe	. . by tipping, e.g. by lifting one side by levers or wedges (B21B 39/26, B21B 39/28 take precedence)
B21B 39/24	2-Punkt Untergruppe	. . by tongs or grippers
B21B 39/26	2-Punkt Untergruppe	. . by members, e.g. grooved, engaging opposite sides of the work and moved relatively to each other to revolve the work
B21B 39/28	2-Punkt Untergruppe	. . by means of guide members shaped to revolve the work during its passage

Symbol	Typ	Titel
B21B 39/30	2-Punkt Untergruppe	. . by lodging it in a rotating ring manipulator or ring segment manipulator
B21B 39/32	2-Punkt Untergruppe	. . Devices specially adapted for turning sheets
B21B 39/34	1-Punkt Untergruppe	. Arrangements or constructional combinations specifically designed to perform functions covered by more than one of groups B21B 39/02, B21B 39/14, B21B 39/20
B21B 41/00	**Hauptgruppe**	**Guiding, conveying, or accumulating easily-flexible work, e.g. wire, sheet metal bands, in loops or curves; Loop lifters**
B21B 41/02	1-Punkt Untergruppe	. Returning work to repeat the pass or passes
B21B 41/04	2-Punkt Untergruppe	. . above or underneath the rolling stand or rolls
B21B 41/06	1-Punkt Untergruppe	. in which the direction of movement of the work is turned through approximately 180°
B21B 41/08	1-Punkt Untergruppe	. without overall change in the general direction of movement of the work
B21B 41/10	2-Punkt Untergruppe	. . Loop deflectors
B21B 41/12	1-Punkt Untergruppe	. Arrangements of interest only with respect to provision for indicating or controlling operations
B21B 43/00	**Hauptgruppe**	**Cooling beds, whether stationary or moving; Means specially associated with cooling beds, e.g. for braking work or for transferring it to or from the bed (conveying means in general B65G)**
B21B 43/02	1-Punkt Untergruppe	. Cooling beds comprising rakes or bars (B21B 43/10 takes precedence) [2]
B21B 43/04	1-Punkt Untergruppe	. Cooling beds comprising rolls or worms
B21B 43/06	1-Punkt Untergruppe	. Cooling beds comprising carriages (B21B 43/08 takes precedence)
B21B 43/08	1-Punkt Untergruppe	. Cooling beds comprising revolving drums or recycling chains
B21B 43/10	1-Punkt Untergruppe	. Cooling beds with other work-shifting elements projecting through the bed
B21B 43/12	1-Punkt Untergruppe	. Devices for positioning workpieces "flushed", i.e. with all their axial ends arranged in line on cooling beds or on co-operating conveyers [2]
B21B 45/00	**Hauptgruppe**	**Devices for surface treatment of work, specially combined with or arranged in, or specially adapted for use in connection with, metal-rolling mills (B21B 15/00 takes precedence; technical features of scaling-off devices B21C 43/00)**
B21B 45/02	1-Punkt Untergruppe	. for lubricating, cooling, or cleaning
B21B 45/04	1-Punkt Untergruppe	. for de-scaling
B21B 45/06	2-Punkt Untergruppe	. . of strip material (B21B 45/08 takes precedence)
B21B 45/08	2-Punkt Untergruppe	. . hydraulically
B21B 47/00	**Hauptgruppe**	**Auxiliary arrangements, devices or methods in connection with rolling of multi-layer sheets of metal (soaking pits C21D 9/70) [2]**
B21B 47/02	1-Punkt Untergruppe	. for folding sheets before rolling
B21B 47/04	1-Punkt Untergruppe	. for separating layers after rolling
B21B 99/00	***Hauptgruppe***	***Subject matter not provided for in other groups of this subclass [2006.01]***