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Machine translation

1. [20060013675](#) WORKPIECE CHANGER FOR MACHINING MACHINES

US - 19.01.2006

Int.Class [B23Q 7/04](#) Appl.No 11177289 Applicant Maschinenfabrik Berthold Hermle AG Inventor Bernhard Franz-Xaver

A workpiece changer for shifting workpieces or workpiece palettes between a set-up station arranged in front of a machining machine and a workpiece table has a gripper means for accepting and depositing workpiece or workpiece palettes, there being a rotary drive for pivoting the gripper means about a vertical axis and a lifting means for lifting and lowering the gripper means. A linear drive serves for transferring the gripper means between a first position at the set-up station and a second position at the workpiece table. Accordingly while ensuring satisfactory access to the workpiece table during machining extremely high speed workpiece changing operations may be performed at any desired machining machine.

2. [102008005956](#) MACHINING CENTER I.E. GANTRY-TYPE MACHINING CENTER, FOR E.G. LATHING OF WORKPIECE, HAS SET-UP STATION FOR SETTING UP AND TAKING DOWN OF WORKPIECE AND/OR WORKPIECE PALLET, WHERE SET-UP STATION IS ARRANGED IN STORAGE ARRANGEMENT

DE - 06.08.2009

Int.Class [B23Q 7/04](#) Appl.No 102008005956 Applicant Maschinenfabrik Berthold Hermle AG Inventor Bernhard Franz-Xaver

The center [10] has a workpiece changer [13] that is arranged between a storage arrangement, arranged before the center, and a workpiece table [11]. A set-up station [22] is provided for temporary storage before and/or after machining a workpiece or a workpiece pallet [12] and/or for setting up and taking down of the workpiece and/or the workpiece pallet. The set-up station is arranged in the storage arrangement and forms a unit [21]. The unit is arranged parallel to a linear machining direction of the changer. The unit is separated from the changer over a protective device [23].

3. [20140301800](#) TOOL SPINDLE

US - 09.10.2014

Int.Class [B23Q 11/12](#) Appl.No 14245960 Applicant Maschinenfabrik Berthold Hermle AG Inventor BERNHARD Franz-Xaver

An embodiment includes a two-part power-driven tool spindle that comprises a spindle motor housing in which a first liquid cooling duct extends, a spindle head housing in which a second liquid cooling duct extends, the first and second liquid cooling ducts forming a liquid cooling circuit for a coolant, and a liquid duct, through which the coolant can be conveyed out of the liquid cooling circuit to at least one resealable outlet opening in the spindle head housing and/or in the spindle motor housing. The liquid duct branches off from the second liquid cooling duct in the spindle head housing and/or from the first liquid cooling duct in the spindle motor housing, in such a way that the coolant in the spindle motor housing and the coolant in the spindle head housing can flow out of the tool spindle under gravity.

4. [20040052601](#) SPINDLE HEAD FOR A MACHINE TOOL

US - 18.03.2004

Int.Class [B23C 1/00](#) Appl.No 10649774 Applicant Maschinenfabrik Berthold Hermle AG Inventor Bernhard Franz-Xaver

A spindle head for a machine tool with a motor-spindle unit arranged on or integrated in the spindle head has a drive motor whose shaft is in the form of a spindle to hold tools, workpieces or workpiece blanks. The drive motor of the motor-spindle unit is able to be slid in the axial direction in the spindle housing, a compressible means being provided for impeding axial displacement of the drive motor into the spindle housing and by such compressible means the drive motor is held as far as a predetermined axial force level in its predetermined working position. Accordingly protection against collisions may be provided in a simple and economic manner also for spindle heads whose drive motor is integrated in the spindle housing.

5. [102010023278](#) WORKPIECE PROCESSING ARRANGEMENT, HAS WORKPIECE GRIPPER MOVED AT LONGITUDINAL BEAM, WHERE GRIPPER IS SWUNG IN X AND Z-DIRECTIONS AND LONGITUDINAL BEAM IS MOUNTED ON BASE PLATE BY USING STANCHION

DE - 15.12.2011

Int.Class [B23Q 7/02](#) Appl.No 102010023278 Applicant Maschinenfabrik Berthold Hermle AG Inventor Bernhard Franz-Xaver

The arrangement [63] has a vertical machining center [2] in gantry/driving post and beam construction form and a workpiece changer [1] in portal configuration with a longitudinal beam [5] extending in x-direction, where a workpiece gripper [17] is moved at the longitudinal beam. The workpiece gripper is moved around z-direction and is swung in x and z-directions. The workpiece changer comprises a workpiece preparation place [3] with a rotatable preparation place desk [34], where the longitudinal beam is mounted on a base plate [41] by using a stanchion [12].

6. [202014007115](#) VORRICHTUNG ZUR COMPUTERGESTÜTZTEN STEUERUNG VON BEARBEITUNGSZENTREN FÜR FRÄS-, BOHR- UND/ODER DREHBEARBEITUNG

DE - 30.10.2014

Int.Class [G05B 19/418](#) Appl.No 202014007115 Applicant Maschinenfabrik Berthold Hermle AG Inventor

Computergestützte Steuerungsvorrichtung [1] für Fräs-, Bohr- und/oder Dreh-Bearbeitungszentren [2], insbesondere zur computergestützten Steuerung eines Bearbeitungszentrums [2], das durch mindestens ein Automatisierungssystem [3, 4, 18] automatisch mit Werkstücken [5, 9], Werkstückpaletten [6] und/oder Werkzeugen [10] versorgt wird, wobei die computergestützte Steuerungsvorrichtung [1] eine Vielzahl von Maschinenachsen und mindestens eine Werkzeug- und/oder Werkstückspindel anhand von Bearbeitungsprogrammen steuert und dabei Sensordaten von Peripheriegeräten berücksichtigt, benötigte Aktoren oder Nebenaggregate ansteuert und gegebenenfalls mit weiteren computergestützten Steuerungsvorrichtungen [7, 8] von Automatisierungssystemen [3, 4] kommuniziert, dadurch gekennzeichnet, dass die computergestützte Steuerungsvorrichtung [1] zusätzlich zu den genannten Steuerungsaufgaben auch Aufgaben zur Auftragsorganisation übernimmt, indem sie für die anstehenden Bearbeitungsaufträge [20] anhand

bestimmter Merkmale, wie Bearbeitungspriorität, vorhandene Rohteile [9], zu bearbeitende Stückzahl oder Bestand und Zustand von benötigten Werkzeugen [10] einen optimierten Ablaufplan [21] erstellt, der an einem mit der computergestützten Steuerungsvorrichtung [1] verbundenen Bildschirm [11] angezeigt wird und an diesem Bildschirm [11] außerdem die erforderlichen Bedienertätigkeiten aufgezeigt werden, die für ein unterbrechungsfreies Abarbeiten des Ablaufplans [21] vorbereitet werden müssen.

7. [102010023276](#) ANORDNUNG ZUM BEARBEITEN VON WERKSTÜCKEN

DE - 15.12.2011

Int.Class [B23Q 1/01](#) Appl.No 102010023276 Applicant Maschinenfabrik Berthold Hermle AG Inventor Bernhard Franz-Xaver

Anordnung [63] zum Bearbeiten von Werkstücken [32], wobei eine x-Richtung und eine y-Richtung zueinander senkrecht und horizontal definiert sind und eine z-Richtung senkrecht zur x-Richtung und y-Richtung definiert ist, umfassend – ein Bearbeitungszentrum [2] mit – einem Maschinengestell [19] mit zwei Seitenwandungen [43, 44] die jeweils parallel zur y- und z-Richtung stehen, – einer auf oder an den Seitenwandungen [43, 44] gelagerten werkzeugtragenden Baugruppe [66] mit einer in x-, y- und z-Richtung verfahrbaren Werkzeugspindel [62], und – einer zwischen den beiden Seitenwandungen [43, 44] angeordneten werkstücktragenden Baugruppe [65], und – eine rückseitige Trennwand [50] zwischen den beiden Seitenwandungen [43, 44] zum Abtrennen des Arbeitsbereichs [48] der werkzeugtragenden Baugruppe [66] vom Magazinbereich [49] des Werkzeugmagazins [28], und – einer vorderseitigen Arbeitsraumtür [71] zwischen den beiden Seitenwandungen [43, 44], und – einen Werkstückwechsler [1] in Portalbauform mit einem sich in x-Richtung über das Maschinengestell [19] hinaus erstreckenden Längsträger [5] und zumindest einem am Längsträger [5] verfahrbaren und zur gleichzeitigen Aufnahme von zwei Werkstücken [32] ausgebildeten Werkstückgreifer [17], – wobei der Werkstückgreifer [17] um die z-Richtung schwenkbar und in x- und z-Richtung verfahrbar ist, und – wobei ein lichter Abstand [70] in y-Richtung zwischen der Trennwand [50] und der Arbeitsraumtür [71] größer dem Störkreisdurchmesser [55] des schwenkenden Werkstückgreifers [17] ist, so dass ein Werkstückwechsel bei geschlossener Arbeitsraumtür [71] zugriffssicher innerhalb des Arbeitsbereiches [48] möglich ist.

8. [20040046302](#) HOLDING MEANS FOR HOLDING TWO PARTS ON EACH OTHER

US - 11.03.2004

Int.Class [B23Q 3/02](#) Appl.No 10639468 Applicant Maschinenfabrik Berthold Hermle AG Inventor Bernhard Franz-Xaver

A clamping device for clamping two parts which more particularly serves for fixing a workpiece palette on a workpiece table. A bolster provided with a projecting shape element is secured to the first part and a cooperating part provided with a recess for receiving the shape element is secured to the second part. A sliding element which runs through the projecting shape element has at least one peripheral recess, into which at least one clamping element is engaged. The clamping element can be moved in a through hole in the shape element and fits in a non-clamping position, and on sliding the sliding element the clamping element is thrust outward into the clamping position. In the clamping position the clamping element interlocks in a recess in the cooperating part.

9. [5611137](#) MACHINE TOOL, MORE PARTICULARLY FOR DRILLING AND MILLING

US - 18.03.1997

Int.Class [B23C 1/06](#) Appl.No 08549238 Applicant Maschinenfabrik Berthold Hermle AG Inventor Braun Hans-Dieter

A machine tool more particularly for drilling and milling, possesses a machine bed, on which a power driven longitudinal slide is adapted to run horizontally on rails. A machining head having a rotary drive device for at least one table forming part of said head, is power moved on the longitudinal slide in at least one further direction of movement. The machine bed possesses two spaced lateral walls, whose intermediate space is designed to serve as a machining zone for receiving at least one work holding means. On the two lateral walls two parallel guide rails are arranged for the longitudinal slide, a third guide rail being arranged with an offset in the longitudinal direction between the two other guide rails. The longitudinal slide is guided using three guide elements on the three guide rails, the power drive being at or adjacent to the central guide rail. On this arrangement a clamping yoke of relatively light design may be employed, which only requires one central drive. Transverse forces caused by twisting in the case of eccentric loading act perpendicularly on the guide elements, which are accordingly better able to withstand the forces.

10. [20140274627](#) VERTICAL MACHINING CENTRE IN GANTRY CONSTRUCTION

US - 18.09.2014

Int.Class [B23Q 3/155](#) Appl.No 14207151 Applicant Maschinenfabrik Berthold Hermle AG Inventor Franz-Xaver Bernhard

A vertical machining center in gantry construction may comprise a machine frame having two side walls configured to receive a tool-carrying assembly and a workpiece-carrying assembly, a moveable pickup tool magazine store within the two side walls of the machine frame configured for a tool change by the pickup method, and a machine enclosure which completely encloses the machining center. Below the moveable pickup tool magazine store there may be a free space in which there is additionally at least one further spare magazine, equivalent in construction to the pickup tool magazine store. A force-driven reloading handling system, with which machining tools can be reloaded from the spare magazine into the pickup tool magazine store and vice versa, may be provided within the machine enclosure at an access opening of the machine frame.

11. [20140371042](#) TOOL MAGAZINE SHELF

US - 18.12.2014

Int.Class [B23Q 3/157](#) Appl.No 14302168 Applicant Maschinenfabrik Berthold Hermle AG Inventor Franz-Xaver Bernhard

An embodiment of a circular, annular tool magazine shelf of a tower construction, comprises a base frame adapted for receiving a tool shelf which has a plurality of immovable tool deposit plates, arranged in vertical succession and in a circular ring, adapted for machining one or more tools, and a power-driven tool handling system adapted for transporting tools between the tool magazine shelf and a machine-side pick-up tool magazine store. The magazine shelf also comprises a spindle tower which is mounted rotatably about a vertical rotation shaft being arranged in a circle center-point of one or more tool deposit plates, wherein the base frame includes a monolithically constructed, plate-shaped foundation in which the rotation shaft is mounted overhanging freely by way of a mounting arrangement.

12. [6206157](#) ROTATING DRIVING UNIT

US - 27.03.2001

Int.Class [F16D 11/06](#) Appl.No 09297379 Applicant Maschinenfabrik Berthold Hermle AG Inventor Kutschka, Werner

The invention relates to a rotary drive for a tool holding device with a shaft for bearing the holding device where the rotary drive performs both machining and milling using a common tool changing device. The inventor has a first hollow shaft [7] arranged concentrically to a shaft [1], the hollow shaft being driven by means of a drive device. Between the shaft [1] and the hollow shaft [7] and engageable and disengageable coupling [15 and 16] is arranged, which can be operated by relative movement of the shaft [1] and the first hollow shaft [7]. Between the shaft [1] and the first hollow shaft [7] a second hollow shaft [12] is arranged to cause such relative axial movement and rotatably bear the shaft [1]. The first hollow shaft [7] is rotatably supported in a housing [5]. Between the first hollow shaft [7] and the second hollow shaft [12] a gripping device is arranged, which couples with the second hollow shaft [12] when hollow shaft [7] is driven.

13. [20040079617](#) WORK CARRIER CHANGEOVER DEVICE FOR MACHINE TOOLS

US - 29.04.2004

Int.Class [B65G 43/00](#) Appl.No 10376328 Applicant Maschinenfabrik Berthold Hermle AG Inventor Bernhard Franz-Xaver

The invention concerns a work carrier changeover device for machine tools, with a work carrier transfer device for moving the work carrier **[16]** between a machining station **[15]** and a tooling station **[21]**. The work carrier transfer device has a coupling element **[25]** rotatable around a vertical axis and two opposing coupling points **[26, 27]** for the coupling of work carriers **[16]**. The coupling element **[25]** is pivotably mounted at free end section of a swivel arm **[24]** capable of swivelling around a vertical axis.

14. [20090283950](#) MACHINING CENTER WITH A ROTATABLE AND PIVOTABLE WORKPIECE TABLE HAVING A CLAMPING DEVICE FOR THE ROTATION AXIS

US - 19.11.2009

Int.Class [B23Q 1/25](#) Appl.No 12432732 Applicant Maschinenfabrik Berthold Hermle AG Inventor Bernhard Franz-Xaver

A machining center that includes a swivel bridge supported by a bearing wall and pivotable about a horizontal axis, at least one drive sprocket attached to a disc-type connector of the swivel bridge, and at least one drive system attached adjacent the bearing wall and operatively connected to the drive sprocket of the swivel bridge. The machining center is characterized by clamping of the swivel bridge being performed by a friction-locked clamping system which is arranged rotationally fixed about a bearing pin of the swivel bridge in a circular ring shape and which is operatively connected to the disc-type connector. A clamping force of the friction-locked clamping system is generated by an energy storage.

15. [102009056492](#) VERTIKALES BEARBEITUNGSZENTRUM IN GANTRY-BAUFORM MIT EINER AUSWUCHTEINRICHTUNG FÜR DEN WERKSTÜCKTISCH

DE - 09.06.2011

Int.Class [B23Q 11/00](#) Appl.No 102009056492 Applicant Maschinenfabrik Berthold Hermle AG Inventor Bernhard Franz-Xaver

Die Erfindung betrifft ein vertikales Bearbeitungszentrum in Gantry-Bauform zum Fräsen, Bohren und Drehen, mit einem U-förmigen Maschinengestell mit zwei Seitenwandungen und einem an den Seitenwandungen gelagerten, um eine horizontale Achse schwenkbaren Brückenträger **[3]** und einem im Brückenträger **[3]** gelagerten, angetriebenen drehbaren Werkstücktisch **[1]**, mit mindestens einem Messsystem für die Ermittlung der Drehzahl und/oder der Winkelposition des Werkstücktisches **[1]**, und mit einer Spannfläche **[34]** an der Tischoberfläche des Werkstücktisches **[1]** zur Aufnahme und zum Befestigen von Werkstücken für die Fräs-, Bohr- und Drehbearbeitung, und mit mindestens einer Messeinrichtung im Brückenträger **[3]** für die Ermittlung der Tischunwucht, und mit mindestens zwei Auswuchtgewichten **[4]** am Werkstücktisch **[1]** für die Kompensation der Tischunwucht und mit einer Steuer- und Regeleinrichtung **[14]** für die Positionsbestimmung der Auswuchtgewichte **[4]** am Werkstücktisch **[1]**.

Um ein derartiges Bearbeitungszentrum zu schaffen, mit der eine Platz sparende, kollisionsfreie, sichere und leicht automatisierbare Befestigung von Auswuchtgewichten an einem drehbaren Werkstücktisch möglich wird, ist erfindungsgemäß vorgesehen, dass unterhalb der Tischoberfläche eine zum Drehpunkt des Werkstücktisches **[1]** konzentrische und kreisringförmige Aufnahme-Nut **[6]** mit einem Hinterschnitt **[7]** eingearbeitet ist, dass die Auswuchtgewichte **[4]** in ihrer äußeren geometrischen Form so ausgestaltet sind, dass sie beweglich in der Aufnahme-Nut **[6]** mit Hinterschnitt **[7]** geführt und in horizontaler und vertikaler Richtung gegen Herausfallen gesichert sind, und dass die Auswuchtgewichte **[4]** in eine von der Steuer- und Regeleinrichtung **[14]** vorbestimmte Winkelposition verfahrbar und in dieser Winkelposition kraft- oder formschlüssig in der Aufnahme-Nut **[6]** festlegbar sind.

16. [20170300031](#) RACK STORAGE UNIT AND AUTOMATION SYSTEM

US - 19.10.2017

Int.Class [H02B 1/20](#) Appl.No 15484271 Applicant Maschinenfabrik Berthold Hermle AG Inventor Franz-Xaver Bernhard

A rack storage unit for use in an automation system for a storage of work pieces and/or work piece pallets and/or tools, which includes a base frame with a rack stand and two rack side parts arranged at a distance from one another, wherein facing surfaces of the rack side parts are provided with interfaces for mounting placement devices. It is provided that the base frame is produced as a one-piece cast body from artificial stone, and that the interfaces are held by adhesive force as separately formed insert parts in the facing surfaces of the rack side parts.

17. [6200247](#) MACHINE TOOL WITH TOOL CHANGER

US - 13.03.2001

Int.Class [B23B 47/00](#) Appl.No 09503325 Applicant Maschinenfabrik Berthold Hermle AG Inventor Braun, Hans-Dieter

A machine tool and more particularly a drilling and/or milling machine, which has a machine stand, on which a slide arrangement, which runs on guide rails and is motor driven, is able to be moved in either direction of horizontal motion. On this slide arrangement a working head is arranged to receive rotary tools. Underneath the working head in a working area a power driven machining table runs along vertical guide rails for the performance of vertical working movements. The working area is laterally delimited by two side walls at least partly, such side walls extending in parallelism to the longitudinal direction, the vertical guide rails for the working table being arranged on one of the side walls. This means that there is a simple design allowing for removal of shavings to the rear and accordingly a narrow form of the machine. A further point is that a transverse wall connecting the side walls remains free so that there is simple access to a tool magazine arranged behind these part

18. [20070022591](#) CUTTING MACHINE WITH A WORKPIECE CHANGER

US - 01.02.2007

Int.Class [B23Q 7/00](#) Appl.No 11494569 Applicant Maschinenfabrik Berthold Hermle AG Inventor Bernhard Franz-Xaver

A cutting machine having a workpiece changer possessing a receiving element for the workpieces and/or workpiece palettes, said receiving element pivots about a vertical axis and is linearly shiftable in a plane normal to such axis. A tool spindle moves on two parallel side walls which are divided by a transverse wall or by door which can be opened or shut between a front machining area and a rear supply area. The radius of the receiving element extends at least partly into a supply area and the tool spindle is movable over the front machining area. Accordingly a person minding or controlling the functioning cutting machine is not hampered by workpiece changing.

19. [20030129035](#) WORKPIECE HOLDING MEANS FOR MACHINE TOOLS AND MORE ESPECIALLY FOR MILLING AND/OR DRILLING MACHINES

US - 10.07.2003

Int.Class [B23B 39/06](#) Appl.No 10155025 Applicant Maschinenfabrik Berthold Hermle AG Inventor Schwörer, Tobias

A workpiece holding means for machine tools and more particularly for milling and/or drilling machines, comprising a pivoting bridge supported between two bearing walls. The bearing walls respectively laterally delimit a working area. At least one drive motor serves for pivoting the pivoting bridge, such motor being arranged outside the working area on at least one outer side of the bearing walls. The pivoting bridge is provided with a gear ring adjacent to one or



both of the inner sides of the bearing walls, such gear ring being drivingly connected with the drive gear wheel driven by at least one drive motor. The bearing points or bearing pins of the pivoting bridge accordingly do not have to transmit any drive torque and are not subjected to any torque load so that more precise running and more precise positioning is possible.

20. [20060010681](#) WORKPIECE CHANGER FOR MACHINING MACHINES

US - 19.01.2006

Int.Class [B65G 37/00](#) Appl.No 11175197 Applicant Maschinenfabrik Berthold Hermle AG Inventor Bernhard Franz-Xaver

A workpiece changer for transfer of workpiece palettes between a storage arrangement arranged in front of a machining machine for such workpiece palettes and a workpiece table, possesses a gripper device for receiving and putting down workpiece palettes and a rotary drive for swiveling the gripper device about a vertical axis. A linear drive serves to shift the gripper means between a first position on the storage arrangement and a second position on the workpiece table. The storage arrangement possesses at least one change station for the transfer and acceptance of workpiece palettes by the gripper device, a conveyor apparatus being provided for the supply and removal of workpiece receiving station to and from the change station. Accordingly, satisfactory access is provided to the workpiece table during machining and workpiece changing operations may be performed at a high speed on any desired machining machines.

21. [5678291](#) MACHINE TOOL

US - 21.10.1997

Int.Class [B23C 1/06](#) Appl.No 08550681 Applicant Maschinenfabrik Berthold Hermle AG Inventor Braun Hans-Dieter

A machine tool more particularly for drilling and milling, possesses a machine bed, on which a power driven longitudinal slide is adapted to run horizontally on rails. A machining head having a rotary drive device for at least one table forming part of said head, is power moved on the longitudinal slide in at least one further direction movement. The machine bed possesses two spaced lateral walls, on which the longitudinal slide is at least partly guided and whose intermediate space is designed in the form of a machining zone. On each of the two lateral walls a fastening point is provided for at least one pivoting work holding device, the two fastening points being aligned in a horizontal line, which defines a pivot axis, athwart the longitudinal direction of the guide rails. In such an arrangement the work holding means is readily accessible and is easy to service and furthermore may be simply replaced. Materials such as shavings, lubricant and coolant are substantially prevent from reaching the bearings and drive means.

22. [20210023680](#) WORKPIECE PALLET AND MACHINING SYSTEM

US - 28.01.2021

Int.Class [B25B 5/10](#) Appl.No 16937238 Applicant Maschinenfabrik Berthold Hermle AG Inventor Stefan Gruler

A workpiece pallet for use for additive and subtractive workpiece machining, including a clamping plate which has a first interface which is designed for a form-fitting fixation to a machining table of a processing machine, the workpiece pallet further including a receiving plate, which has a second interface for fixing a workpiece, wherein the clamping plate and the receiving plate are arranged spaced apart from one another and wherein a supporting web is arranged in a connecting gap between an upper surface of the clamping plate and a lower surface of the receiving plate, which supporting web is connected to the upper surface of the clamping plate and to the lower surface of the receiving plate, the supporting web having in a cross-sectional plane aligned parallel to the lower surface of the receiving plate a cross-sectional area which is less than 15 percent of an area of the lower surface of the receiving plate.

23. [WO/1999/012700](#) ROTATING DRIVING UNIT

WO - 18.03.1999

Int.Class [B23Q 5/14](#) Appl.No PCT/EP1998/005689 Applicant MASCHINENFABRIK BERTHOLD HERMLE AG Inventor KUTSCHKA, Werner

The invention relates to a rotating driving unit for a tool holder device having a shaft supporting a locking device. The inventive rotating driving unit is characterised in that a hollow shaft (7) is disposed concentrically with said shaft (1) and can be driven by another drive unit, in that an engaging and disengaging coupler (15, 16), disposed between the shaft (1) and the hollow shaft (7), can be driven by means of axial relative displacement between the shaft (1) and the hollow shaft (7), in that another hollow shaft (12), which is disposed between the shaft (1) and the hollow shaft (7), causes said axial relative displacement and supports the shaft (1), in that said hollow shaft (7) is mounted in a housing (5) and in that a locking device, disposed between the hollow shaft (7) and the other hollow shaft (12), couples the hollow shaft (7) with the other hollow shaft (12), when the hollow shaft (7) is displaced during driving.

24. [2008073842](#) MOTOR SPINDLE FOR DRIVING OF TOOL ON MACHINE TOOL

JP - 03.04.2008

Int.Class [B23B 19/02](#) Appl.No 2007242291 Applicant MASCHINENFABRIK BERTHOLD HERMLE AG Inventor BERNHARD FRANZ-XAVER

PROBLEM TO BE SOLVED: To simply remove a spindle shaft and a tool holding means from a motor spindle without damaging a bearing of a motor shaft and disassembling a spindle motor.

SOLUTION: The motor spindle is provided with: the spindle motor having the motor shaft; the spindle shaft having the tool holding means and driven by the motor shaft, a retracting rod slidable in the axial direction of the spindle shaft for holding a tool. The retracting rod extends from the tool holding means through the spindle shaft and motor shaft. The motor shaft is revolvably supported in a motor housing and independent from the spindle shaft, whereas the spindle shaft is supported in a spindle housing and independent from the motor shaft. The spindle shaft is interlocked with the rotation of the motor shaft, and at the same time, is freely slidable in the axial direction of the motor shaft. The spindle housing composes a structural unit having the tool holding means.

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25. [2006026892](#) WORKPIECE CHANGING DEVICE FOR MACHINE TOOL

JP - 02.02.2006

Int.Class [B23Q 7/00](#) Appl.No 2005207073 Applicant MASCHINENFABRIK BERTHOLD HERMLE AG Inventor BERNHARD FRANZ-XAVER

PROBLEM TO BE SOLVED: To accomplish satisfactory approach to a workpiece table during machining and to perform workpiece changing operation at very high speed even in a desired machine tool.

SOLUTION: This workpiece changing device moves a workpiece or a workpiece pallet 10 between an arrangement station 13 disposed in front of the machine tool 12 and the workpiece table 11 of the machine tool. The device includes: a gripper means 20 for receiving or unloading the workpiece or the workpiece pallet 10; a rotary driving device for turning a gripper means 20 around a longitudinal axis; and an elevating means for raising or lowering the gripper means 20. A linear driving device plays a part of moving the gripper means 20 between a first position on the arrangement station 13 and a second position on the workpiece table 11.

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26. [2014200909](#) TWO-PART STRUCTURED, LIQUID-COOLED TOOL SPINDLE JP - 27.10.2014

Int.Class [B23B 19/02](#) Appl.No 2014059861 Applicant MASCHINENFABRIK BERTHOLD HERMLE AG Inventor FRANZ-XAVER BERNHARD

PROBLEM TO BE SOLVED: To provide a tool spindle with which the cooling liquid can be emptied from the liquid cooling circuit before starting to dismount the spindle head.

SOLUTION: The tool spindle is a two-part structured, power-driven tool spindle, comprising a spindle motor housing 3 in which a liquid cooling duct 2 extends, and a spindle head housing 5 in which a liquid cooling duct 4 extends, the liquid cooling ducts 2, 4 forming a liquid cooling circuit for a coolant. The tool spindle further comprises a liquid duct 12, through which the coolant can be conveyed out of the liquid cooling circuit to at least one resealable outlet opening 13 in the spindle head housing 5 or in the spindle motor housing 3. The liquid duct branches off from the liquid cooling duct 4 in the spindle head housing 5 or from the liquid cooling duct 2 in the spindle motor housing 3, in such a way that the coolant in the spindle motor housing 3 and the coolant in the spindle head housing 5 can flow out of the tool spindle under gravity.

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27. [2014172171](#) VERTICAL MACHINING CENTER OF GANTRY STRUCTURE WITH MACHINE-INTEGRATED TOOL JP - 22.09.2014
MAGAZINE STORE

Int.Class [B23Q 3/157](#) Appl.No 2014044050 Applicant MASCHINENFABRIK BERTHOLD HERMLE AG Inventor FRANZ-XAVER BERNHARD

PROBLEM TO BE SOLVED: To increase a storage capacity of a machine inherent-type tool magazine store without increase of an installation area.

SOLUTION: A free space in which at least one spare magazine which has a structure equivalent to that of a pickup tool magazine store 5 is further added below the pickup tool magazine store 5 is provided. Further, a power operation-type reload handling system 15 which can reload a working tool 12 in a direction from the spare magazine to the pickup tool magazine store 5 or in a reverse direction is provided to access openings 9, 18 of a machine frame 15 in a machine housing.

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28. [2002052404](#) ROTARY DRIVING DEVICE JP - 19.02.2002

Int.Class [B23B 19/02](#) Appl.No 2001181900 Applicant MASCHINENFABRIK BERTHOLD HERMLE AG Inventor BERNHARD FRANZ-XAVER

PROBLEM TO BE SOLVED: To provide a rotary driving device for switching the rotating speed of a tool holder.

SOLUTION: This rotary driving device is provided with an output drive shaft 10 for supporting the tool holder 17, and the output drive shaft 10 is enabled to move in the first and second axial directions depending on the preset drive. The output drive shaft 10 is connected to a power drive type first drive gear wheel 14 in the first axial position, and connected to a co-axial tubular shaft in the second axial position. The coaxial tubular shaft is driven through a worm drive 32 by a power drive type second drive gear wheel 15.

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29. [2015000472](#) CYLINDRICAL TOOL MAGAZINE SHELF OF TOWER STRUCTURE AND RELOAD METHOD OF TOOL JP - 05.01.2015

Int.Class [B23Q 3/157](#) Appl.No 2014082177 Applicant MASCHINENFABRIK BERTHOLD HERMLE AG Inventor FRANZ-XAVER BERNHARD

PROBLEM TO BE SOLVED: To provide a pickup tool magazine store incorporated into an economical machine, and oriented in the vertical direction.

SOLUTION: In a cylindrical tool magazine shelf 1 of a tower structure, the tool magazine shelf 1 comprises: a base frame, that is, the base frame of continuing in the vertical direction, and supporting a power-drive type tool handling system 5 for carrying a tool in the bidirection between a tool shelf 3 for a machining tool 6 having a plurality of fixed type tool placing plates 4 arranged in an annular ring shape, the tool magazine shelf 1 and a machine side pickup tool magazine store; and a spindle tower 8 rotatably provided around a vertical rotary shaft 7 arranged at a circle center point of the tool placing plates 4, in which the base frame is constituted of a plate-like foundation 2 of a monolithic structure for providing the rotary shaft 7 by a mount mode of not fixing a projection part.

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30. [2007038398](#) CUTTING MACHINE WITH WORKPIECE EXCHANGER JP - 15.02.2007

Int.Class [B23Q 1/06](#) Appl.No 2006208266 Applicant MASCHINENFABRIK BERTHOLD HERMLE AG Inventor BERNHARD FRANZ-XAVER

PROBLEM TO BE SOLVED: To provide a cutting machine having a workpiece table that does not move horizontally, requires less space compared with a conventional workpiece exchanger and does not expose a machinery operator standing in front of the cutting machine to danger.

SOLUTION: A slide mechanism is formed so as to move over two parallel side walls (11 and 12) provided on the cutting machine formed in a gantry type machine. Such side walls determine a cutting region. An intermediate space between the side walls is divided into a front cutting region and a back cutting range by horizontal wall or a door (19) that is closed while a workpiece is cut and of which at least a portion is opened while the workpiece is changed. The revolution radius of a receiving element (26) engaged with the workpiece or a workpiece palette is extended to at least a portion of the supply region.

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31. [2000326160](#) MACHINE TOOL JP - 28.11.2000

Int.Class [B23Q 1/00](#) Appl.No 2000094712 Applicant MASCHINENFABRIK BERTHOLD HERMLE AG Inventor BRAUN HANS-DIETER

PROBLEM TO BE SOLVED: To provide a machine tool narrow in width, capable of being approached while being excellent in arrangement.

SOLUTION: A processing head is provided for the horizontal slide of a machine tool, and a revolving tool is also mounted thereon. Under the machining head in a machining area 15, a power driven machining table 33 is running along a vertical guide rail 32 in order to perform a vertical machining action. The machining area 15 is regulated partially at least, by two side walls 12 and 13 in the horizontal direction. The side walls 12 and 13 are extended in the longer direction in parallel, and the vertical guide rail 32 is provided for either one of the side wall 12 or the side wall 13. This constitution thereby allows a structure to be simple just for disposing of cutting chips afterward, and also allows the machine tool to be made narrow in width, and since a horizontal wall 14 connecting the side wall 12 with the side wall 13, can be kept free, these portions can be easily approached to a tool magazine 17 placed afterward.

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32. **2009279753** MACHINING CENTER WITH ROTATABLE AND PIVOTABLE WORKPIECE TABLE HAVING CLAMPING DEVICE OF ROTATION AXIS JP - 03.12.2009

Int.Class B23Q 1/28 Appl.No 2009110986 Applicant MASCHINENFABRIK BERTHOLD HERMLE AG Inventor BERNHARD FRANZ-XAVER

PROBLEM TO BE SOLVED: To materialize operation clamping of a swivel bridge without a driving control part, to make the operation clamping have no substantial clearance, and to surely and exactly receive largest processing moment.

SOLUTION: The operation clamping of the swivel bridge 22 is performed by a friction-locked clamping system 1 which is arranged rotationally fixed about a bearing pin 13 of the swivel bridge 22 in a circular ring shape and which is operatively connected to a disc-type connector 12. A clamping force of the friction-locked clamping system 1 is generated by an energy storing part 2.

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33. **2002361530** WORKPIECE HOLDER FOR MACHINE TOOL, IN PARTICULAR, MILLING MACHINE AND/OR DRILLING MACHINE JP - 18.12.2002

Int.Class B23Q 1/50 Appl.No 2002154027 Applicant MASCHINENFABRIK BERTHOLD HERMLE AG Inventor SCHWOERER TOBIAS

PROBLEM TO BE SOLVED: To provide a workpiece holder capable of preventing the torque from being applied to a bearing pin.

SOLUTION: The workpiece holder has a turning bridge 10 supported between two bearing walls 13 and 14. The bearing walls 13 and 14 demarcate a working area from the side surface. At least one drive motor 23 turns the turning bridge 10, and the motor 23 is disposed on at least one of outer surfaces of the bearing walls 13 and 14 outside the working area. The turning bridge 10 has a gear ring 21 adjacent to either or each of the bearing walls 13 and 14, and the gear ring 21 is connected so as to transmit the power to a drive gear wheel 27 driven by at least one drive motor 23. Thus, bearing pins 11 and 12 of the turning bridge 10 need not transmit the drive torque, or any torque is not applied thereto, enabling correct traveling and correct positioning.

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34. **2006026893** WORKPIECE CHANGING DEVICE FOR MACHINE TOOL JP - 02.02.2006

Int.Class B23Q 7/00 Appl.No 2005207074 Applicant MASCHINENFABRIK BERTHOLD HERMLE AG Inventor BERNHARD FRANZ-XAVER

PROBLEM TO BE SOLVED: To accomplish satisfactory approach to a workpiece table during machining and to perform workpiece changing operation at very high speed even in a desired machine tool.

SOLUTION: This workpiece changing device moves a workpiece or a workpiece pallet 10 between a storage means 14 and the workpiece table 11 of the machine tool 12. The device includes: a gripper means 20 for receiving and unloading the workpiece or the workpiece pallet 10; and a rotary driving device for turning the gripper means 20. A linear driving device moves the gripper means 20 between a first position on a storage means 14 and a second position on the workpiece table 11. The storage means 14 includes a changing station 28 for moving and receiving the workpiece or the workpiece pallet 10 by the gripper means 20. A carrying means is provided to supply and retreat the workpiece pallet 10 and/or a workpiece receiving means 26 to the changing station 28 and from the changing station 28.

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35. **2290832** MÁQUINA DE MECANIZACIÓN CON UN CAMBIADOR DE PIEZAS DE TRABAJO ES - 16.02.2008

Int.Class B23Q 1/66 Appl.No 05016638 Applicant MASCHINENFABRIK BERTHOLD HERMLE AKTIENGESELLSCHAFT
Inventor Bernhard, Franz-Xaver

Máquina de mecanización con un cambiador de piezas de trabajo [27; 37] para el desplazamiento de piezas de trabajo a mecanizar y/o de plataformas de carga de piezas de trabajo [31, 32] entre al menos un puesto de transferencia [30] fuera de la máquina de mecanización y una mesa de piezas de trabajo [22] de la máquina de mecanización no desplazable horizontalmente, en la que el cambiador de piezas de trabajo [27; 37] posee un elemento de alojamiento [26] giratorio alrededor de un eje vertical y desplazable linealmente en un plano que se encuentra perpendicularmente a este eje para piezas de trabajo y/o plataformas de piezas de trabajo, y con una disposición de carro [15, 16] móvil con motor en una, en menos en las dos direcciones horizontales, caracterizada porque la disposición de carro [15, 16] está guiada en dos paredes laterales paralelas [11, 12] de la máquina de mecanización configurado a modo de una máquina Gantry, que delimitan lateralmente una zona de mecanización [20], y porque el espacio intermedio entre las paredes laterales [11, 12] está dividido por medio de una pared transversal [19] y/o puerta [34] cerrada durante la mecanización de la pieza de trabajo y al menos parcialmente abierta durante el proceso de las piezas de trabajo, en una zona de mecanización delantera [20] y una zona de alimentación trasera [21], en la que el radio de giro [25] del elemento de alojamiento [26] provisto con una pieza de trabajo o con una plataforma de carga de piezas de trabajo [31, 32] encaja al menos en parte en la zona de alimentación [21].

36. **107433565** RACK STORAGE UNIT AND AUTOMATION SYSTEM CN - 05.12.2017

Int.Class B25H 3/04 Appl.No 201710252790.6 Applicant MASCHINENFABRIK BERTHOLD HERMLE AG Inventor TOBIAS SCHWOERER

A rack storage unit for use in an automation system for a storage of work pieces and/or work piece pallets and/or tools, which includes a base frame with a rack stand and two rack side parts arranged at a distance from one another, wherein facing surfaces of the rack side parts are provided with interfaces for mounting placement devices. It is provided that the base frame is produced as a one-piece cast body from artificial stone, and that the interfaces are held by adhesive force as separately formed insert parts in the facing surfaces of the rack side parts.

37. **112276562** WORKPIECE PALLET AND MACHINING SYSTEM CN - 29.01.2021

Int.Class B23P 23/00 Appl.No 202010722951.5 Applicant MASCHINENFABRIK BERTHOLD HERMLE AG Inventor GRULER STEFAN

The invention relates to a workpiece pallet, comprising: a clamping plate having a first interface, which is designed to be positively fastened to a machining table of a machining machine; a receiving plate used for fixing a workpiece, wherein the receiving plate comprises a second connector used for fixing the workpiece, the clamping plate and the containing plate are arranged at a distance from each other, and a carrier web [17] is arranged in the connection gap between the upper side of the clamping plate and the lower side of the receiving plate, said carrier web being connected to the upper side [21] of the clamping plate [15] and to the lower side [22] of the receiving plate [16]. According to the invention, the carrier web [17] has, in a cross-section oriented parallel to the lowerface [22] of the receiving plate [15], a cross-sectional area that is smaller than 15%, preferably 10%, particularly preferably 5%, particularly 1%, of the area of the lower face [22] of the receiving plate [16].



