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(54) PUNCH MACHINE WITH SHEET METAL ROLL FEED

(57) The punch machine (1) which performs punching in the materials in the form of coiled sheet metal (200) by means of the punching tool (118) and hammer group (117) and pressing ram (115) producing motion in vertical z-axis, characterized in comprising at least two movable units (114) moved linearly in y-axis in two separate working areas when said coiled sheet metal (200) is still in the form of roll prior to being cut; groups configured on each said movable unit (114) and moving in x, y and z axis; a conveyor (125) pushing the sheet metal coil (200), the punching process of which is completed by means of said pressing ram (117) and punching tool (118), to the product exit (A1); and guillotine shears (124) cutting the coiled sheet metal (200) advanced to the final section by means of said conveyor (125) in determined sizes.

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Description

Technical Field

[0001] The invention is related to punching machines which creates punching and forming the sheet metals in different geometric shapes.

[0002] Said invention is related to a punching machine, which the coiled sheet material is uncoiled , straightened and moved forward and reverse in the determined dimension , and then subject to punching, forming and notching processes in the coiled sheet metal punching machine, and the sheet metal is delivered through conveyor without any help of operator support.

Prior Art

[0003] In the punching machines used in the prior art, tool is fixed and sheet metal is movable or the tool is movable and sheet material is fixed. In both cases, punching process is performed on the sheet metal in different geometric shapes by means of the cutting tool.

[0004] In the existing system , sheet metal is cut in the required sizes by the cut-to-length line, then is stacked in the form of plate and packed. Afterwards, plate materials, which are stacked up, are taken one by one by means of one or two operator(s) and placed on the working plane of the punching machine. In fact, this situation results in high labor force and production process. First cutting of the sheet metal in desired size, arranging and then positioning the same on the bench by operators substantially affect the production process and costs. Besides, as sheet metal is utilized it is obligatory to adhere to size dimensions of the sheet metal. Likewise, as sheet metal is utilized, due to the limitations again in the sizes, difficulties are experienced during placement and large amount of scrap is produced while the product to be released is being programmed.

[0005] The following points regarding the punch machines used in the prior art negatively affect the manufacturers;

- Processing only the leveled sheet metals ,
- Inability of providing structures that will produce complex products,
- Experiencing 25-40% loss of scrap when utilizing the sheet metal,
- Sheet loading time, e.g. experiencing time loss of 30 seconds to 2 minutes between each operation.

[0006] In the patent search with respect to the existing technology , an application No. TR 2011/12276 is encountered. In the abstract of this application, the following is disclosed: The invention relates to a punch machine which comprises a circular lower turret where the sheet metal brought to the production area to perform cutting and/or forming processes thereon is fixed; a circular upper turret which extends parallel to said lower turret in a manner to remain a certain space therebetween and will process on the sheet metal; at least one fixed index assembly having multiple cylindrical assembly bearings formed inside said upper turret and an assembly tip which is capable of being adapted into said assembly bearings when required and will process on the sheet metal. Said punch machine is characterized in further comprising at least one multi-index assembly having an assembly bushing which is fixed into the assembly bearings to perform cutting and/or forming processes on the sheet metal in desired shapes.

[0007] In another application No. TR 2011/12281, on the other hand, the following is disclosed: The invention relates to a punch machine which comprises a lower turret parallel to the ground surface and an upper turret having an index assembly which comprises thereon an assembly body fixed thereto with a temporary connection to form the sheet metal and an assembly bearing where said index assembly is fitted, between which the sheet metal is positioned. Said punch machine is characterized in that said assembly bearing is provided in a size suitable to the assembly body with the largest diameter and that it comprises at least one index group which is provided in such sizes to be adapted into all present assembly bodies by being fixed to the assembly bearing when desired.

Description of the Invention

[0008] The object of the invention is to process the sheet metal in the form of coil instead of the sheet metal processed one by one in the form of plate in the prior art. Thereby, processing of the sheet metal rapidly and with low cost without requiring extra time and labor is performed.

[0009] One object of the invention is to perform the production by processing the sheet metal rapidly and with low cost, to substantially save on energy and to present a punch machine with a 3-axis freedom.

[0010] Another object of the invention is that two movable tool holder units will perform the lateral motions while unidirectional motion thereof forms the sheet metal. While the tool holder units perform the unidirectional motion, thanks to the fact that the two tool holder units are capable of moving independently of each other, they are provided with the

ability of processing simultaneously but differently on the sheet metal to be processed.

[0011] Another object of the invention is to save on the sheet metal as it is in the form of coil and then again to cut the sheet metal by means of guillotine shears integrated to the punch machine. The sheet metal, which is cut, is removed from the cutting line by a conveyor means without requiring any operator.

[0012] Another object of the invention is that the 3-axis CNC punch machine has the features to provide processing of the sheet metal coil. All the processes of the product to be produced by computer numerical control are performed in line with the program to be preinstalled in the machine with semi skilled labour.

[0013] Another object of the invention is to provide transition from the technical drawing of the product directly to the operation of the machine by a single operator by means of a special software. Thus, the use of a single operator is ensured in the machine and stacking is performed automatically.

[0014] With the punch machine according to the invention;

- Complex products are processed,
- Low operating costs are provided,
- Quite long pieces can be processed, length limitation is eliminated,
- Ease of use is achieved compared to the other machines,
- Saving on labor is achieved,
- Ease of stocking is achieved as the system makes use of the roll,
- Automatic stacking is provided during production, stacking is prevented from lowering the speed of the machine,
- Saving on raw material is achieved at a rate of 20% as the sheet metal is obtained with the desired width and without waste,
- CNC punch machine operate automatically and there is no need to an operator continuously,
- Innovations such as the decoilers , straighteners and punching systems, and plate CNC to be used as additional equipment are provided.

[0015] To achieve the aforementioned objects, the invention is a punch machine which performs punching in the sheet materials in the form of coiled sheet metal by means of the cutting tool and hammer group and pressing ram producing motion in vertical z-axis, characterized in comprising a front inlet panel with a product inlet opening through which said coiled sheet metal is entered;

- at least two movable units moved linearly in y-axis in two separate working areas when said coiled sheet metal is still in the form of roll prior to being cut;
- linear and circular motion group moving in x, y and z axis and configured on each said movable unit;
- conveyor pushing the coiled sheet metal, the punching process of which is completed by means of said hammer group and cutting punches, to the product exit;
- guillotine shears cutting the coiled sheet metal (200) advanced to the final section by means of said conveyor in determined sizes.

Figures to Facilitate Understanding of the Invention

[0016]

Figure-1 is the representative front general perspective view of the punch machine according to the invention when the sheet metal in the form of coil is subjected to the process.

Figure-2 is the representative front two dimensional view of the punch machine according to the invention when the front panel is removed.

Figure-3 is the representative top two dimensional view of the punch machine according to the invention.

Part Numbers

[0017]

100-	Punching machine	124- Guillotine shear
110-	Front inlet panel	125- Conveyor
111-	Rear outlet panel	126- Product entry opening
113-	Base Frame	200- Coiled sheet metal
114-	Movable unit	A- Product entry
115-	Pressing Ram	A1- Product exit
117-	Hammer group	
118-	Punching tool	
119-	Cassette	
120-	Connector	

Detailed Description of the **Invention**

[0018] The punching machine (100) performs punching the sheet materials in the form coiled sheet metal (200) by means of the punching tool (118) and hammer group (117) and pressing ram (115) which moves in vertical z-axis. It comprises a front inlet panel (110) with a product entry opening (126) which the coiled sheet metal (200) is entered. It comprises at least two movable units (114) moved linearly in y-axis in two separate working areas when said coiled sheet metal (200) is still in the form of roll prior to being cut; and a structure moving in x, y and z axis and configured on each said movable unit (114). Moreover, it comprises a conveyor (125) pushing the coiled sheet metal (200), the punching process of which is completed by means of said hammer group (117) and cutting tool (118), to the product outlet (A1); and guillotine shears (124) cutting the coiled sheet metal (200) advanced to the final section by means of said conveyor (125) in determined sizes. Likewise, the motion of the double movable unit (114), which are moved linearly in two separate working areas, in y-axis is provided by means of the drive mechanisms.

[0019] Figure-1 is the representative front general perspective view of the punch machine (100) according to the invention when the sheet metal (200) in the form of coil is subjected to the process. The coiled sheet metal (200) is driven through the product entry opening (126) formed in the front inlet panel (110) from product entry (A) section into the machine. In accordance with the parameters determined by the CNC system, the coiled sheet metal (200) driven into the machine is punched by means of the hammer group (117) and punching tool (118) illustrated in Figure-2. There are connectors (120) connecting the machine to the ground and carrying all the load.

[0020] In Figure-2, the front inlet panel (110) is removed for a clearer understanding of the system. Punching process is applied to the sheet material by means of the hammer group (117) and cutting tool (118). The punch machine (100) comprises double movable unit (114). Symmetrical movable units (114) are linearly moved in y-axis by means of the cassette (119). Linear motion in y-axis is provided by drive mechanisms. Linear motion of the cassette (119) is provided. Each movable unit (114) is capable of moving linearly and circularly. The movable units (114) operate in two different areas, thereby performing the punching process rapidly in a shorter time. With the z-axis motion of the hammer group (117), motion is provided in vertical axis. Vertical motion of the hammer group (117) in z-axis is provided by means of the pressing ram (115).

[0021] Figure-3 is the representative top two dimensional view of the punch machine (100) according to the invention. After the punching processes applied to the coiled sheet metal (200) from two sections or two different areas by means of the movable units (114), the punching process is completed. Then, the coiled sheet metal (200) conveyed to the final section is pushed toward the product exit (A1) by a conveyor (125) integrated to the punch machine (100). The coiled sheet metal (200) pushed by the conveyor (125) is cut by means of the guillotine shears (124) and the end product is obtained.

[0022] The punch machine (100) with CNC system has features which will provide processing of the coiled sheet metal (200). All the processes of the sheet metal part to be produced by computer numerical control are ensured to be performed in line with the program to be pre installed in the machine with less workmanship. Thus, a machine with mass production and low cost is presented. Thanks to the CNC feature thereof, the machine can operate integrated with decoiling , straightening, feeding and punching system equipments.

Claims

1. The punch machine (1) which performs punching on the metal materials in the form of coiled sheet metal (200) by means of the punching tool (118) and hammer group (117) and pressing ram (115) producing motion in vertical z-axis, **characterized in** comprising

- a front inlet panel (110) with a product inlet opening (126) through which said coiled sheet metal (200) is entered;
- at least two movable units (114) moved linearly in y-axis in two separate working areas when said coiled sheet metal (200) is still in the form of roll prior to being cut;
- a conveyor (125) pushing the coiled sheet metal (200), the punching process of which is completed by means of said hammer group (117) and punching tool (118), to the product exit (A1);
- guillotine shear (124) cuts the coiled sheet metal (200) advanced to the final section by means of said conveyor (125) in determined sizes.

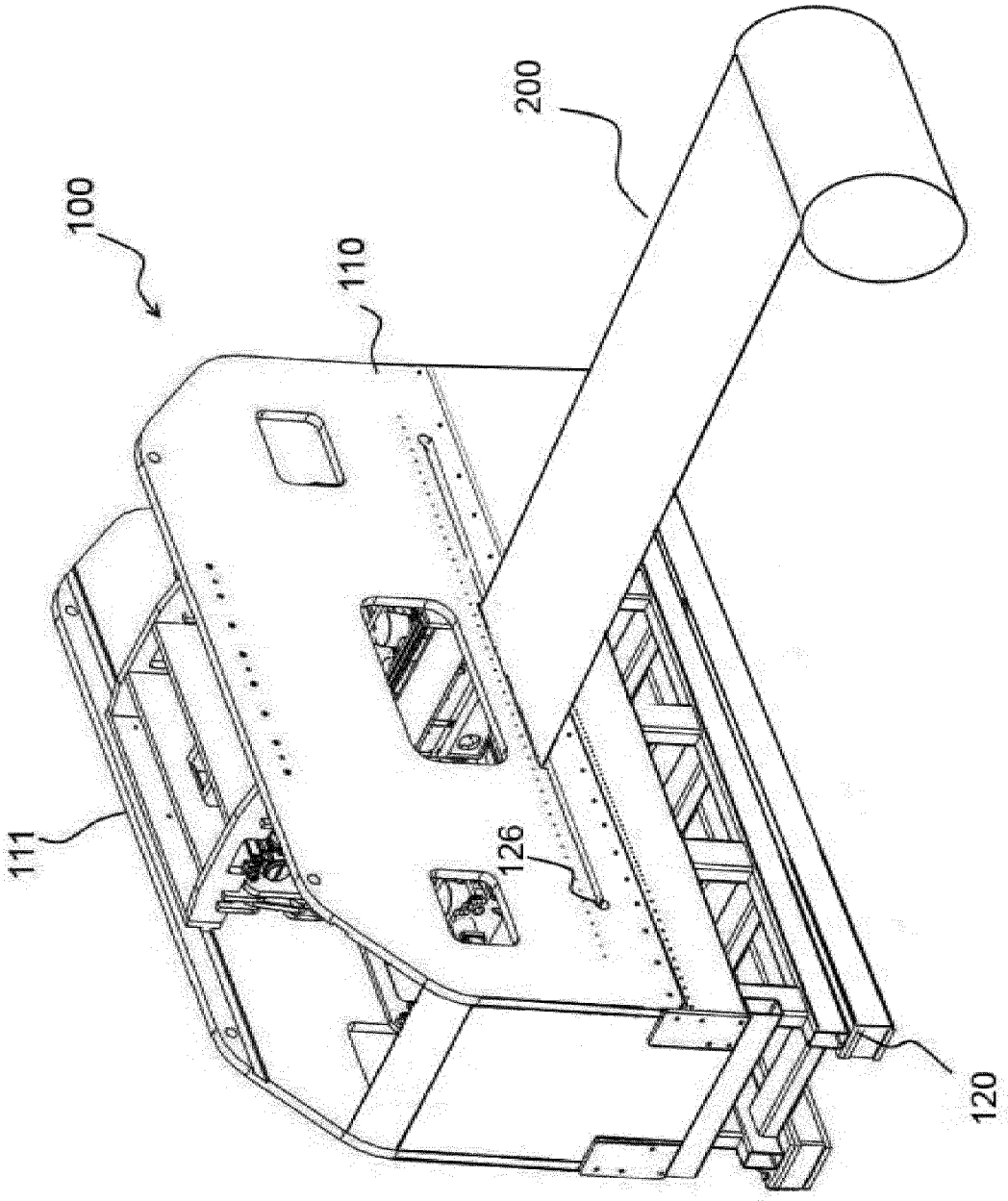


Fig. 1

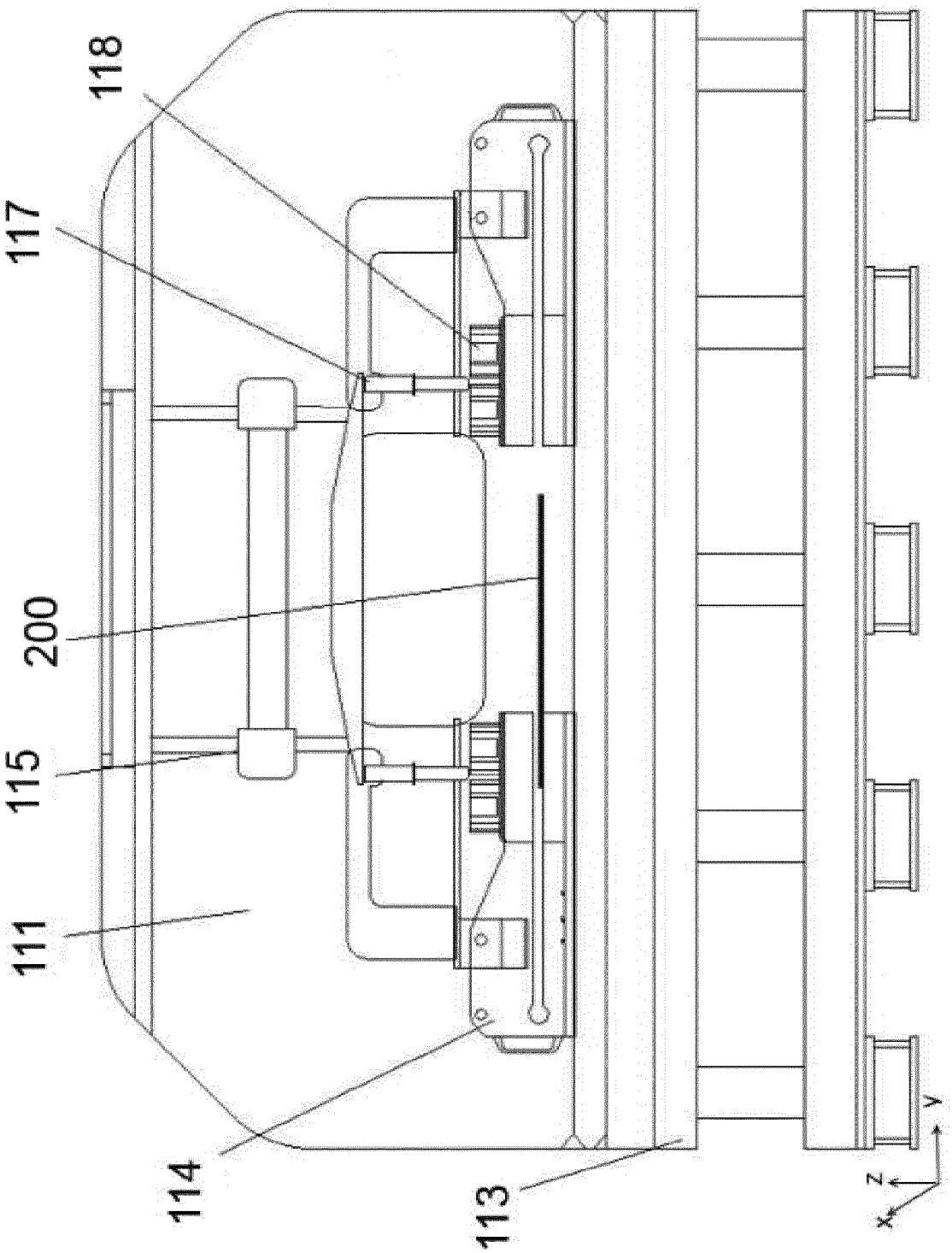


Fig. 2

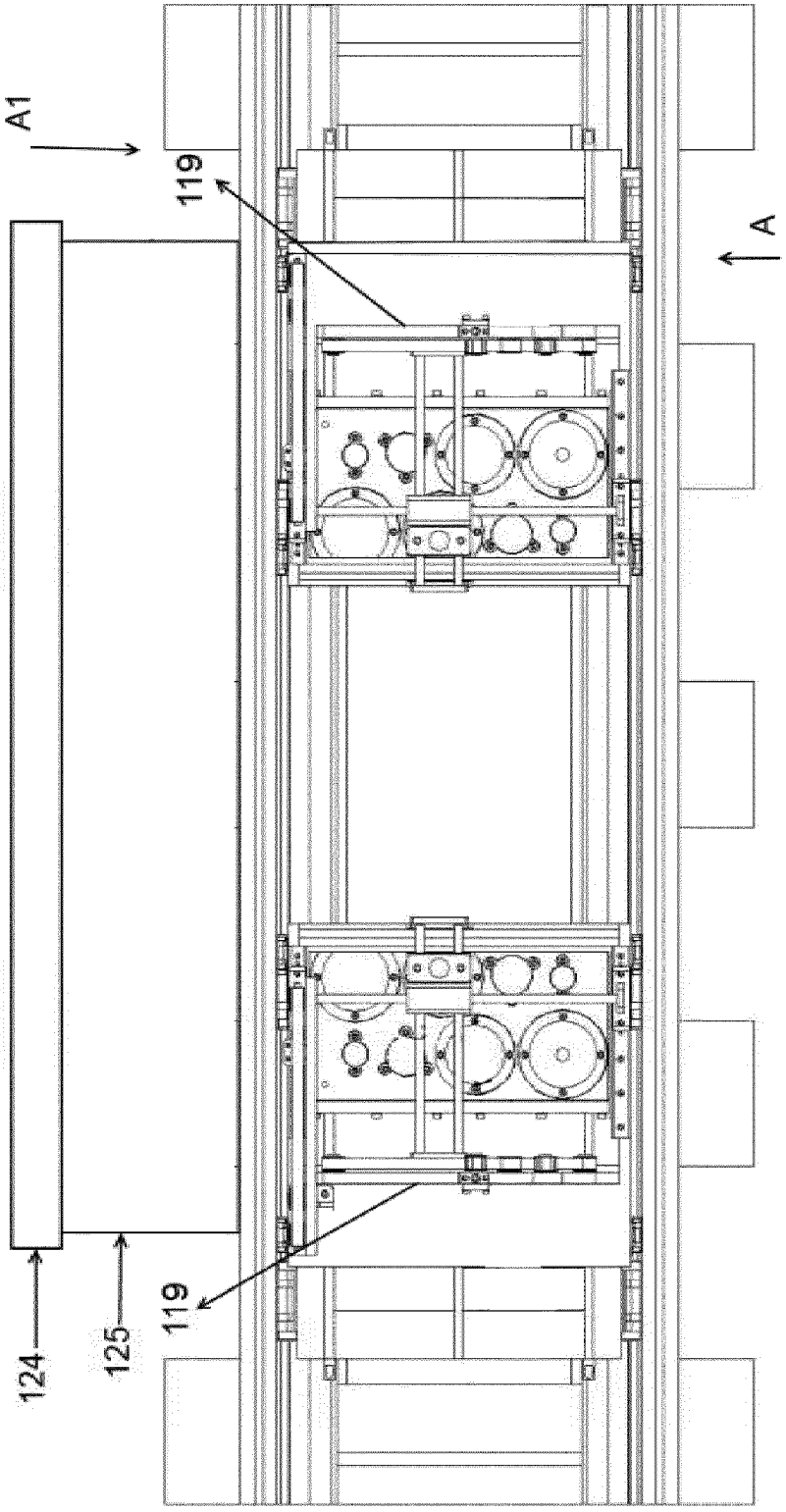


Fig. 3

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EUROPEAN SEARCH REPORT

Application Number
EP 15 16 8560

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 03/015953 A1 (DALLAN SPA [IT]; DALLAN SERGIO [IT]) 27 February 2003 (2003-02-27) * page 2, line 7 - page 3, line 18; figure 1 *	1	INV. B21D28/26 B21D43/28
X	EP 0 839 594 A1 (BRUNI VINCENZO [IT]) 6 May 1998 (1998-05-06) * column 4, line 9 - column 5, line 31; figures *	1	
A	US 3 889 565 A (VECCHI JOHN C) 17 June 1975 (1975-06-17) * the whole document *	1	
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TECHNICAL FIELDS SEARCHED (IPC)

B21D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	12 October 2015	Pieracci, Andrea

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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EPO FORM 1503 03.82 (P04C01)

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12-10-2015

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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- TR 201112276 **[0006]**
- TR 201112281 **[0007]**