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(54) **AN AUXILIARY BENDING TOOL FOR BENDING MACHINES**

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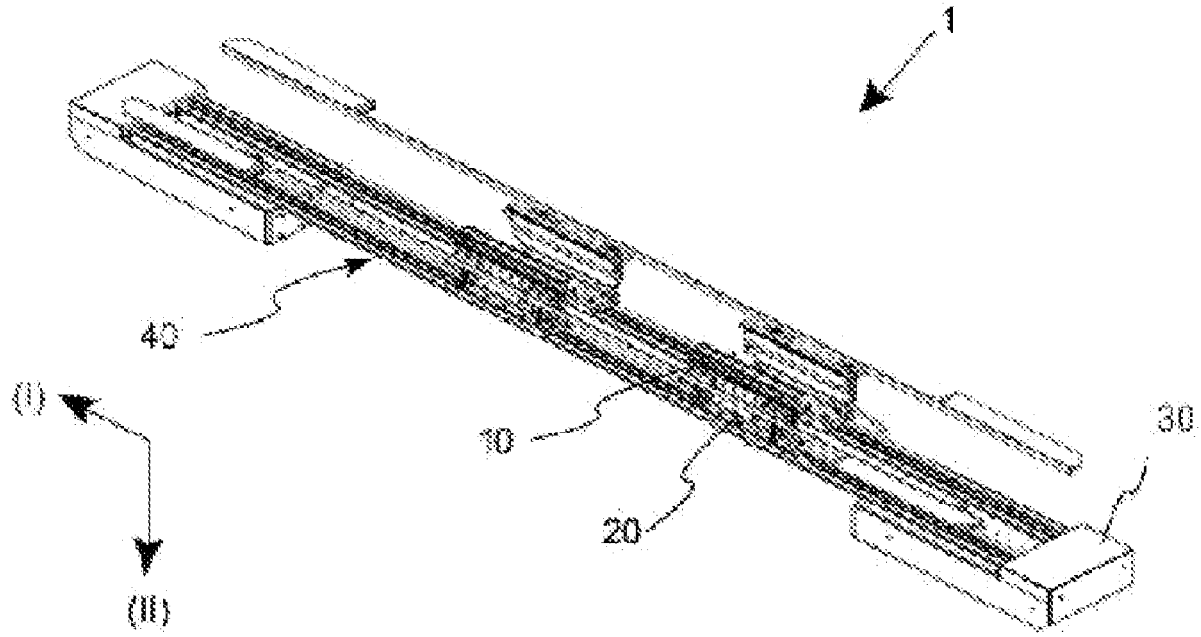
(57) **ABSTRACT**

The present invention relates to an auxiliary bending tool (**1**) associated to a body (**40**) provided in CNC bending machines and which provides the work piece to be bent in various shapes and which can operate together with the present bending tools (**15**). As an improvement, said auxiliary bending tool (**1**) comprises a tool carrier apparatus (**20**) having at least one connection protrusion (**21**) which can be associated onto said body (**40**), a tool locking unit (**10**) connected to an assembly surface (**22**), provided on said tool carrier apparatus (**20**), through a connection surface (**16**) and configured to provide locking of at least one tool (**15**) thereon, and at least one drive group (**30**) for providing forward-backward movement on an axis X (I) of the tool carrier apparatus (**20**) whereon said tool locking unit (**10**) is associated.



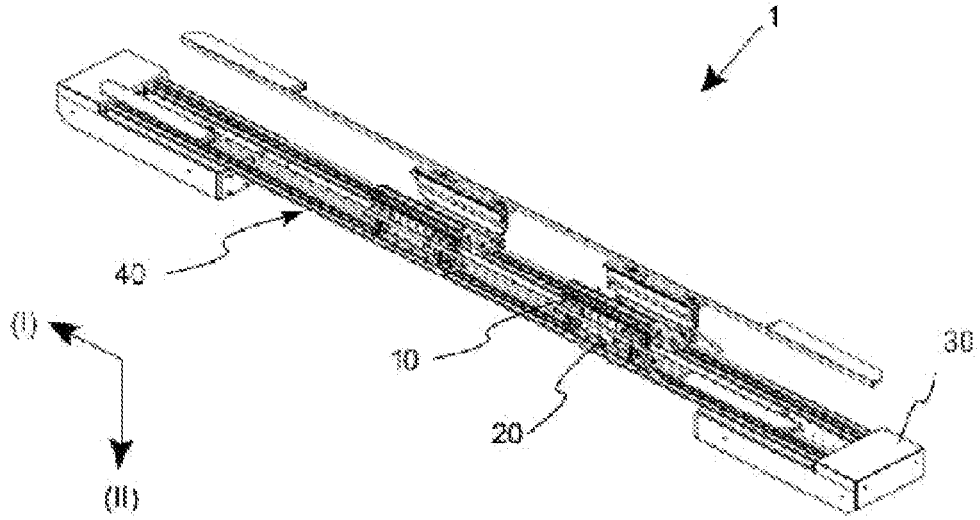


Figure 1

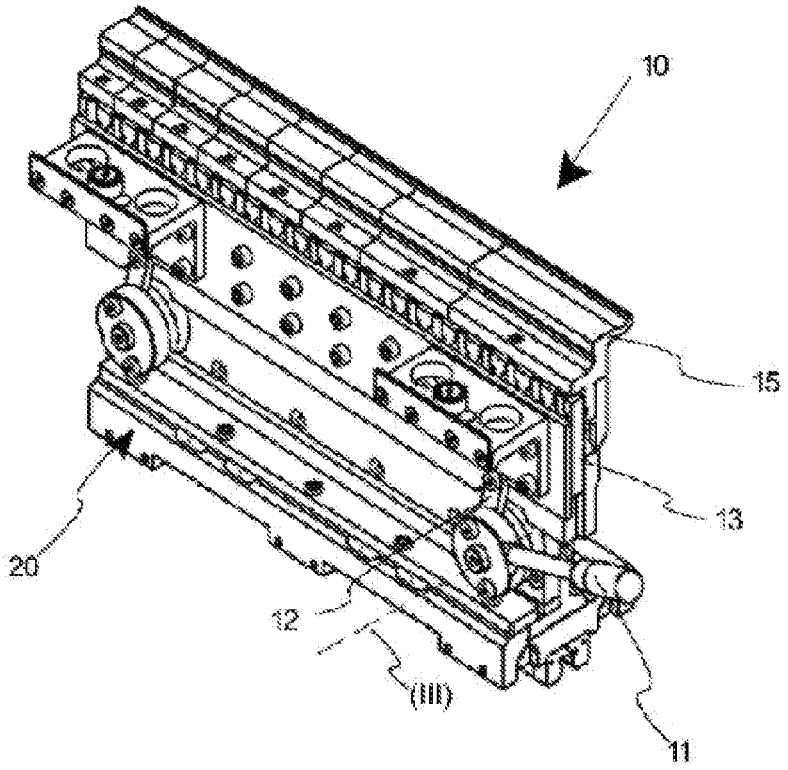


Figure 2

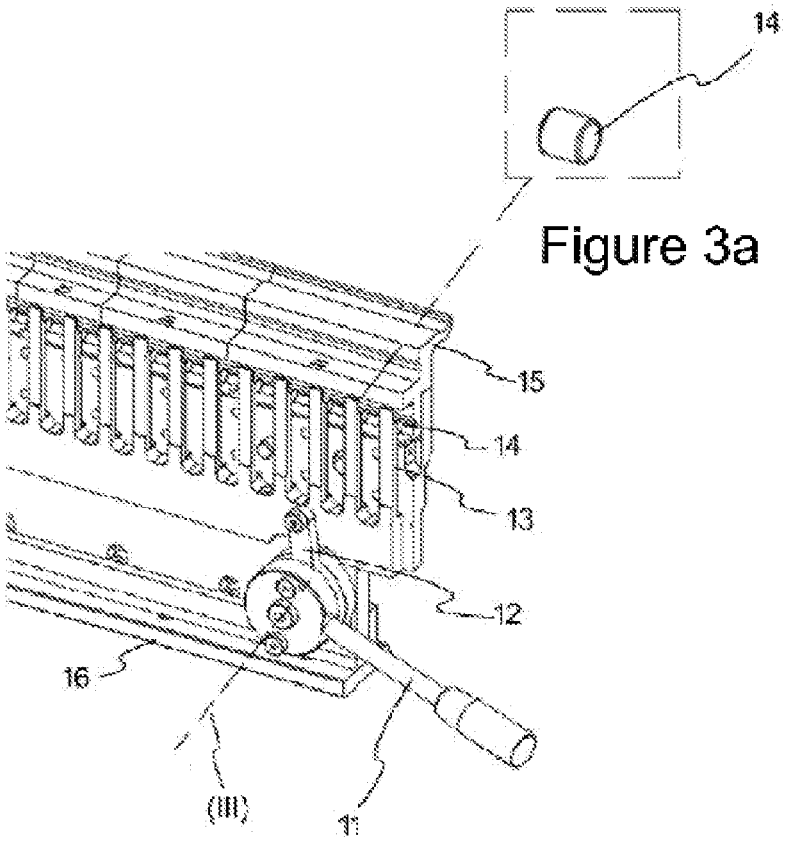


Figure 3a

Figure 3

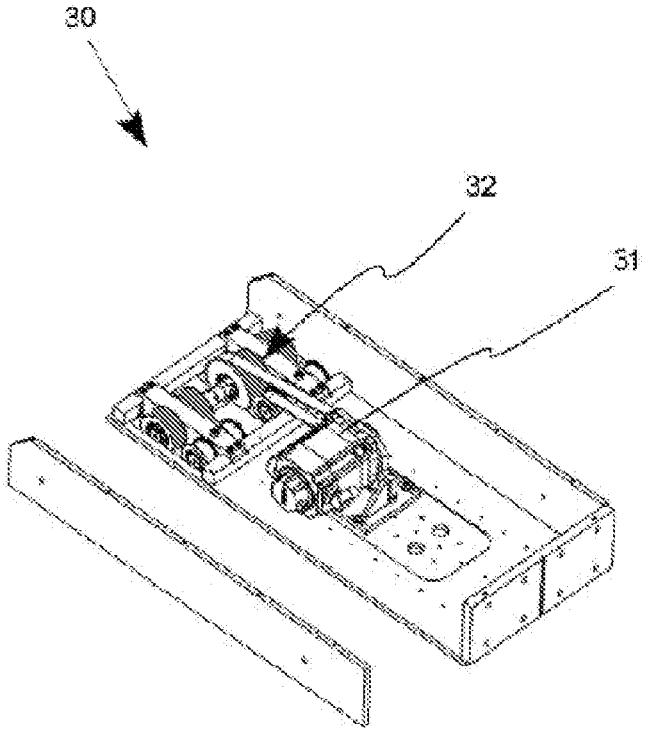


Figure 4

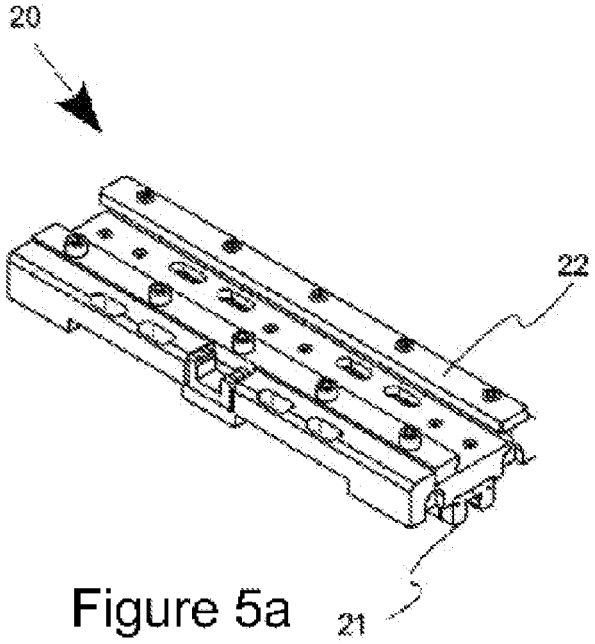


Figure 5a

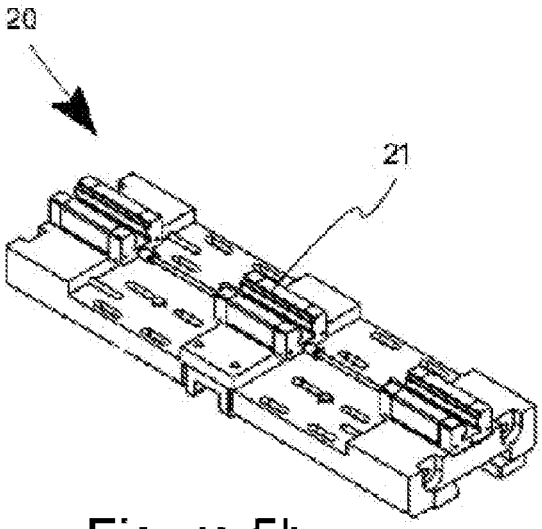


Figure 5b

AN AUXILIARY BENDING TOOL FOR BENDING MACHINES

TECHNICAL FIELD

[0001] The present invention relates to an auxiliary bending tool in order to be used in CNC bending machines.

PRIOR ART

[0002] CNC bending machines provide bending of different sized sheets with high precision and provide said sheets to become suitable for the needs of various sectors. Metal is used in various fields from light industry to heavy industry. However, in various fields, metals are needed to be used in various shapes in a different manner from the flat sheet shape.

[0003] In the known state of the art, there is no auxiliary tool which provides increase of the bending capacity in CNC bending machines. Particularly in bending process in mass production, auxiliary tools are needed which can function in a compliant manner with the present bending tool. In case where partial bending of the part, corner bending and easier and further bending of special profiles are desired, usage of pluralities of machines is required. This leads to increase of the process and the costs, and moreover, this leads to decrease of the production efficiency.

[0004] As a result, because of all of the abovementioned problems, an improvement is required in the related technical field.

BRIEF DESCRIPTION OF THE INVENTION

[0005] The present invention relates to an auxiliary bending tool, for eliminating the above mentioned disadvantages and for bringing new advantages to the related technical field.

[0006] The main object of the present invention is to provide an auxiliary bending tool which functions in a compliant manner to the bending tool existing in CNC bending machines and which increases bending capacity and which helps in special profile bending, corner bending and similar bending.

[0007] In order to realize the abovementioned objects and the objects which are to be deducted from the detailed description below, the present invention relates to an auxiliary bending tool associated to a body provided in CNC bending machines and which provides the work piece to be bent in various shapes and which can operate together with the present bending tools. Accordingly, said auxiliary bending tool comprises a tool carrier apparatus having at least one connection protrusion which can be associated onto said body, a tool locking unit connected to an assembly surface, provided on said tool carrier apparatus, through a connection surface and configured to provide locking of at least one tool thereon, and at least one drive group for providing forward-backward movement on an axis X of the tool carrier apparatus whereon said tool locking unit is associated. Thus, an auxiliary bending tool is provided which functions in a compliant manner to the bending tool existing in CNC bending machines and which increases bending capacity and which helps in special profile bending, corner bending and similar bending.

[0008] In a possible embodiment of the present invention, said tool locking unit comprises a tool locking arm which can realize rotational movement around an axis A, at least one movement element associated with said tool locking arm and which provides transferring of the movement transferred from the tool locking arm, at least one lock element associated with said movement element, at least one tool locking element which provides compression and fixation of said tool by means of the movement of said lock element in an axis Z. Thus, the tool is locked in the tool locking unit provided in the auxiliary bending tool.

[0009] In a possible embodiment of the present invention, said drive group comprises at least one drive transfer unit configured to be driven by at least one drive element and to provide movement of the tool carrier apparatus in said axis X. Thus, transfer of the auxiliary bending tool in the direction of axis X on the body is provided.

BRIEF DESCRIPTION OF THE FIGURES

[0010] FIG. **1** is a representative perspective view of the form where the subject matter auxiliary bending tool is associated with the body.

[0011] FIG. **2** is a representative perspective view of tool locking unit in the subject matter auxiliary bending tool.

[0012] FIG. **3** is a zoomed representative perspective view of the lock element in the subject matter auxiliary bending tool.

[0013] FIG. **3***a* is a zoomed representative perspective view of the tool locking element in the subject matter auxiliary bending tool.

[0014] FIG. **4** is a representative perspective view of the inner part of the drive group which provides movement to the subject matter auxiliary bending tool.

[0015] FIG. **5***a* is a top representative perspective view of the tool carrier apparatus in the subject matter auxiliary bending tool.

[0016] FIG. **5***b* is a bottom representative perspective view of the tool carrier apparatus in the subject matter auxiliary bending tool.

DETAILED DESCRIPTION OF THE INVENTION

[0017] In this detailed description, the subject matter auxiliary bending tool (**1**) is explained with references to examples without forming any restrictive effect only in order to make the subject more understandable.

[0018] In FIG. **1**, a representative perspective view of the form where the subject matter auxiliary bending tool (**1**) is associated with the body (**40**) is given. The present invention relates to an auxiliary bending tool (**1**) associated onto a body (**40**) provided in CNC bending machines and provided for helping bending of the work piece in various shapes. In said auxiliary bending tool (**1**), there is a tool carrier apparatus (**20**) having at least one connection protrusion (**21**) in a manner associated onto said body (**40**). There is a tool locking unit (**10**) connected to an assembly surface (**22**), provided on said tool carrier apparatus (**20**), through a connection surface (**16**) provided thereon. Said tool locking unit (**10**) is configured to provide locking of at least one tool (**15**) which provides realization of auxiliary bending process. There is at least one drive group (**30**) for providing movement of the tool carrier apparatus (**20**) on the body (**40**) in direction of an axis X (I). By means of said drive group (**30**), the transfer of the auxiliary bending to the desired location on the body (**40**) is provided by said tool (**15**) provided in the tool locking unit (**10**). As can be seen in FIG.

4, there is drive transfer unit (32) configured to provide movement of the tool carrier apparatus (20) in direction X (I) by means of receiving movement from at least one drive element (31) in the drive group (30).

[0019] In FIG. 2, a representative perspective view of tool locking unit (10) in the subject matter auxiliary bending tool (1) is given. In said tool locking unit (10), there is a tool locking arm (11) which can realize rotational movement around an axis A (III). There is at least one movement element (12) associated with said tool locking arm (11) and which provides transfer of the movement transferred from the tool locking arm (11). Said movement element (12) is connected to at least one lock element (13). As seen in FIG. 3, at least one tool locking element (14) is positioned between said lock element (13) and said tool (15).

[0020] The operation principle of the auxiliary bending tool (1) is as follows: First of all, the suitable tool (15) is locked for the bending process in the tool locking unit (10). In order to provide locking of the tool (15), in the tool locking unit (10), the tool locking arm (11) rotates around axis A (III) and is positioned on an axis Z (II). As the tool locking arm (11) is positioned on axis Z (II), the lock element (13) moves in said axis Z (II) by means of the movement element (12). By means of the movement of the lock element (13) in axis Z (II), said tool locking elements (14), positioned between the tool (15) and the lock element (13), are compressed and the tool (15) is fixed on the tool locking unit (10).

[0021] After the tool is fixed in the tool locking unit (10), the tool carrier apparatus (20), whereto the tool locking unit (10) is connected, is moved in the direction of axis X (I) on the body (40) by means of the drive transfer unit (32) driven by the drive element (31). Thus, in accordance with the additional desired bending processes of the work piece which will be bent in the bending machine, the auxiliary bending tool (1) is transferred to the related bending area.

[0022] The protection scope of the present invention is set forth in the annexed claims and cannot be restricted to the illustrative disclosures given above, under the detailed description. It is because a person skilled in the relevant art can obviously produce similar embodiments under the light of the foregoing disclosures, without departing from the main principles of the present invention.

REFERENCE NUMBERS

[0023] 1 Auxiliary bending tool
[0024] 10 Tool locking unit
[0025] 11 Tool locking arm
[0026] 12 Movement element
[0027] 13 Lock element
[0028] 14 Tool locking element
[0029] 15 Tool
[0030] 16 Connection surface
[0031] 20 Tool carrier apparatus
[0032] 21 Connection protrusion
[0033] 22 Assembly surface
[0034] 30 Drive group
[0035] 31 Drive element
[0036] 32 Drive transfer unit
[0037] 40 Body
[0038] (I) Axis X
[0039] (II) Axis Z
[0040] (III) Axis A

1. An auxiliary bending tool associated to a body provided in CNC bending machines and which provides the work piece to be bent in various shapes and which can operate together with a present bending tool, the auxiliary bending tool comprising:

a tool carrier apparatus having at least one connection protrusion which can be associated onto said body;

a tool locking unit connected to an assembly surface, the tool locking unit provided on said tool carrier apparatus through a connection surface and configured to provide locking of at least one tool thereon; and

at least one drive group configured to provide forward-backward movement on an axis X (I) of the tool carrier apparatus whereon said tool locking unit is associated; wherein said tool locking unit comprises:

a tool locking arm which can realize rotational movement around an axis A (III);

at least one movement element associated with said tool locking arm and which provides transferring of the movement transferred from the tool locking arm;

at least one lock element associated with said movement element; and

at least one tool locking element which provides compression and fixation of said tool by movement of said lock element in an axis Z.

2. (canceled)

3. The auxiliary bending tool according to claim 1, wherein said drive group comprises at least one drive transfer unit configured to be driven by at least one drive element and to provide movement of the tool carrier apparatus in said axis X.

* * * * *