



(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
08.01.2014 Bulletin 2014/02

(51) Int Cl.:
B25B 7/12 (2006.01) B25B 5/14 (2006.01)
B25B 5/16 (2006.01)

(21) Application number: **11870548.2**

(86) International application number:
PCT/CN2011/082154

(22) Date of filing: **14.11.2011**

(87) International publication number:
WO 2013/020335 (14.02.2013 Gazette 2013/07)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

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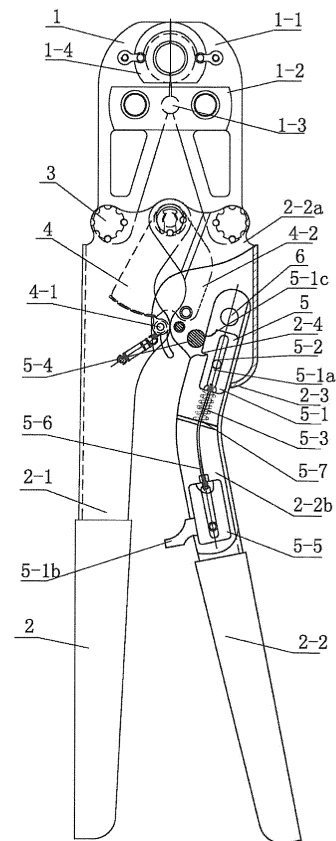
(30) Priority: **09.08.2011 CN 201120286009 U**

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(54) **CLAMPING TOOL CAPABLE OF CHANGING CLAMP HANDLE ANGLE**

(57) A clamping tool capable of changing a clamp handle angle comprises a working head (1), a clamp handle (2) and an adjustment structure (3). The working head (1) is formed by connecting a clamp head (1-1) and a positioning shaft (1-3) through a cover plate (1-2), a replaceable opening mould (1-4) is installed on the clamp head (1-1), the clamp handle (2) comprises a left clamp handle (2-1) and a right clamp handle (2-2), a ratchet retaining mechanism (4) is installed on the clamp handle (2), and the ratched retain-ing mechanism (4) comprises: a ratchet plate (4-2) installed at an upper clamp handle (2-2a) of the right clamp handle (2-2) and a ratchet (4-1) installed on the left clamp handle (2-1); the right clamp handle (2-2) comprises the upper clamp handle (2-2a) and a lower clamp handle (2-2b) movably connected to the upper clamp handle (2-2a) through a rotating shaft (6), and a clamp handle angle adjustment mechanism (5) is installed on the right clamp handle (2-2). When the clamping tool works, the clamp handle angle can be changed easily only by pulling the handle, so that the clamping operation is very laborsaving and the efficiency of installation operations is enhanced. Also, the clamp handle (2) is designed with a certain angle, and through the clamp handle angle adjustment mechanism (5), the phenomenon of touch of two hands during work is prevented.



(FIG. 1)

Description

Field of the Invention

[0001] The present invention relates to the field of hardware tools, and particularly to a clamping tool capable of changing a clamp handle angle.

Background of the Invention

[0002] Well known PVC pipes, PEX pipes and aluminum-plastic composite pipes are widely used as transfer pipes for supplying water, oil and gas, and in the installation of such pipes, a specialized clamping plier must be used for a secure installation. As is well-known, although clamping tools for clamping pipes of a variety of specifications have appeared on the market presently, they're only suitable for the clamping operation of small-sized pipes. When they are used for clamping and connecting of large-sized pipes, it is not only very laborious and time-consuming, which reduces the efficiency of construction, but also brings a lot of inconvenience to constructors. Therefore, it has become an urgent issue to be solved in the hardware industry to design a clamping tool which is structurally reasonable, easy to operate, suitable for connecting large-sized pipes and labor saving.

Summary of the Invention

[0003] The technical problem to be solved in the present invention is to provide a clamping tool capable of changing a clamp handle angle, which has a simple structure, can improve the efficiency of construction operation, is easy to operate, and labor-saving.

[0004] The technical solution adopted in order to solve the above-mentioned technical problem is: A clamping tool capable of changing a clamp handle angle comprises a working head, a clamp handle and an adjustment structure connecting the working head and the clamp handle. The working head is formed by connecting a clamp head and a positioning shaft through a cover plate, and a replaceable opening mould is installed on the clamp head; the clamp handle comprises a left clamp handle and a right clamp handle, and a ratchet retaining mechanism is installed on the clamp handle; the ratchet retaining mechanism comprises a ratchet plate installed at an upper clamp handle of the right clamp handle and a ratchet installed on the left clamp handle; the right clamp handle comprises the upper clamp handle and a lower clamp handle movably connected to the upper clamp handle through a rotating shaft, and a clamp handle angle adjustment mechanism is installed on the right clamp handle.

[0005] Wherein, the clamp handle angle adjustment mechanism comprises: a slider component, a guide pin shaft, a compression spring and a positioning pin shaft used for the adjustment of dominant angle of the right clamp handle. The slider component consists of a main

slider, a steel wire rope and a handle slider. The slider component, which is movably connected to the lower clamp handle through the guide pin shaft, is disposed within a U-shaped slot of the lower clamp handle of the right clamp handle; the positioning pin shaft is installed on the upper clamp handle of the right clamp handle; the compression spring is nested inside the steel wire rope, with one end of the compression spring connected to the main slider, and the other end abutting the spring plank.

[0006] The main slider and the handle slider are in the shape of a following-the-right-clamp-handle type and installed within the right clamp handle. A guide groove is formed on the main slider and the handle slider, through which the main slider and the handle slider slide under the action of the guide pin shaft. An adjustment handle suitable for being pulled by the human hand is formed on the lower part of the outer end of the handle slider, and a groove facilitating the adjustment of the angle of the right clamp handle is formed on the upper part of the main slider.

[0007] The lower end of the upper clamp handle of the right clamp handle is made into a bend stop part to prevent the clamp handle from opening with a too large angle.

[0008] A circular arc groove is formed on the side of the lower clamp handle of the right clamp handle to avoid an acting force produced by the guide pin shaft.

[0009] An outward bending part is formed on the lower clamp handle of the right clamp handle.

[0010] The advantage and positive effect of the present invention is: As the invention adopts the above technical solution, that is, through the ratchet retaining mechanism and the clamp handle angle adjustment mechanism on the clamp handle, the adjustment operation of the angle for opening and closing of the clamp handle can be achieved. When the clamping tool works, the clamp handle angle can be changed easily only by pulling the handle, so that the clamping operation is very labor saving and the efficiency of installation and construction is enhanced. In addition, the clamp handle is designed with a certain angle, and through the clamp handle angle adjustment mechanism, the phenomenon of touch of two hands during work is prevented.

Brief Description of the Drawings

[0011]

FIG. 1 is a schematic view of the structure of the present invention.

FIG. 2 is a schematic view of the opening initial state of the present invention;

FIG. 3 is a schematic view of the initial state of the present invention just about to work after the angle of the clamp handle is adjusted;

FIG. 4 is a schematic view of the state of the adjustment of the angle of the clamp handle, when two hands are about to touch each other during the work

of the present invention.

[0012] In the drawings: 1. working head; 1-1 clamp head; 1-2. cover plate; 1-3. positioning shaft; 1-4 opening mould; 2. clamp handle; 2-1. left clamp handle; 2-2. right clamp handle; 2-2a. upper clamp handle; 2-2b. lower clamp handle; 2-3. bend stop part; 2-4. circular arc groove; 3. adjustment structure; 4. ratchet retaining mechanism; 4-1. ratchet; 4-2. ratchet plate; 5. clamp handle angle adjustment mechanism; 5-1. main slider; 5-1a. guide groove; 5-1b. adjustment handle; 5-1c. groove; 5-2. guide pin shaft; 5-3. compression spring; 5-4. positioning pin shaft; 5-5. handle slider; 5-6. steel wire rope; 5-7. spring plank; 6. rotating shaft; 8. fastener; 9. pipe; 10. pipe joint.

Detailed Description of the Invention

[0013] For a further understand of the summary, characteristics and efficacy of the present invention, the following examples hereby are exemplified and described in detail below with reference to the accompanying drawings:

As shown in FIGs. 1-4, a clamping tool capable of changing a clamp handle angle comprises a working head 1, a clamp handle 2 and an adjustment structure 3. The working head 1 is formed by connecting a clamp head 1-1 and a positioning shaft 1-3 through a cover plate 1-2, and a replaceable opening mould 1-4 is installed on the clamp head; the clamp handle 2 comprises a left clamp handle 2-1 and a right clamp handle 2-2. A ratchet retaining mechanism 4 and a clamp handle angle adjustment mechanism 5 are installed on the clamp handle; the right clamp handle 2-2 comprises the upper clamp handle 2-2a and a lower clamp handle 2-2b movably connected to the upper clamp handle 2-2a through a rotating shaft 6. The ratchet retaining mechanism 4 comprises: a ratchet plate 4-2 installed at an upper clamp handle 2-2a of the right clamp handle and a ratchet 4-1 installed on the left clamp handle. A clamp handle angle adjustment mechanism 5 is installed on the right clamp handle. The clamp handle angle adjustment mechanism comprises: a slider component, a guide pin shaft 5-2, a compression spring 5-3 and a positioning pin shaft 5-4 used for the adjustment of dominant angle of the right clamp handle. The slider component consists of a main slider 5-1, a steel wire rope 5-6, and a handle slider 5-5. The slider component, which is movably connected to the lower clamp handle through the guide pin shaft, is disposed within a U-shaped slot of the lower clamp handle of the right clamp handle; the positioning pin shaft is installed on the upper clamp handle of the right clamp handle; the compression spring is nested inside the steel wire rope, with one end of the compression spring connected to the main slider, and the other end abut-

ting the spring plank 5-7.

[0014] The main slider 5-1 and the handle slider 5-5 are in the shape of a following-the-right-clamp-handle type and installed within the right clamp handle. A guide groove 5-1a is formed on the main slider and the handle slider, through which the main slider and the handle slider slide under the action of the guide pin shaft. An adjustment handle 5-1b suitable for being pulled by the human hand is formed on the lower part of the outer end of the handle slider, and a groove 5-1c facilitating the adjustment of the angle of the right clamp handle is formed on the upper part of the main slider.

[0015] The lower end of the upper clamp handle of the right clamp handle is made into a bend stop part 2-3 to prevent the clamp handle from opening with a too large angle.

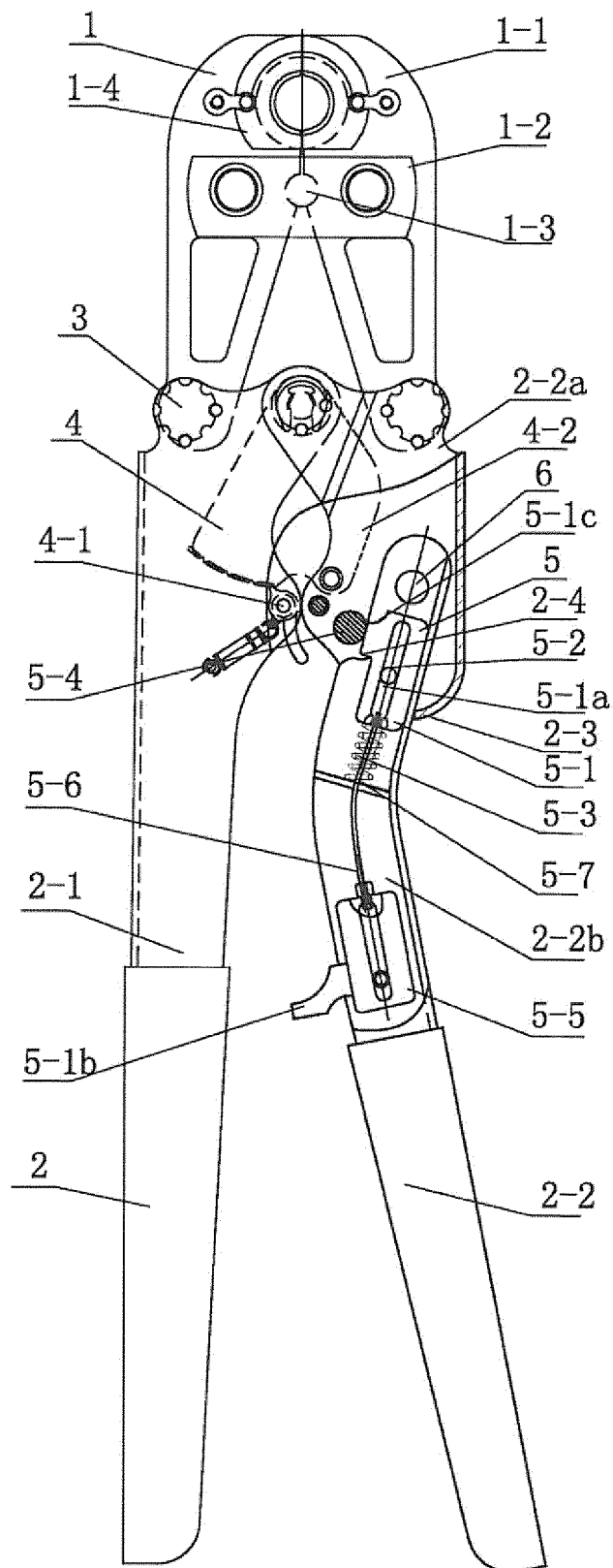
[0016] A circular arc groove 2-4 is formed on the side of the lower clamp handle of the right clamp handle to avoid an acting force produced by the guide pin shaft. An outward bending part is formed on the lower clamp handle of the right clamp handle.

[0017] The working principle of the present invention is:

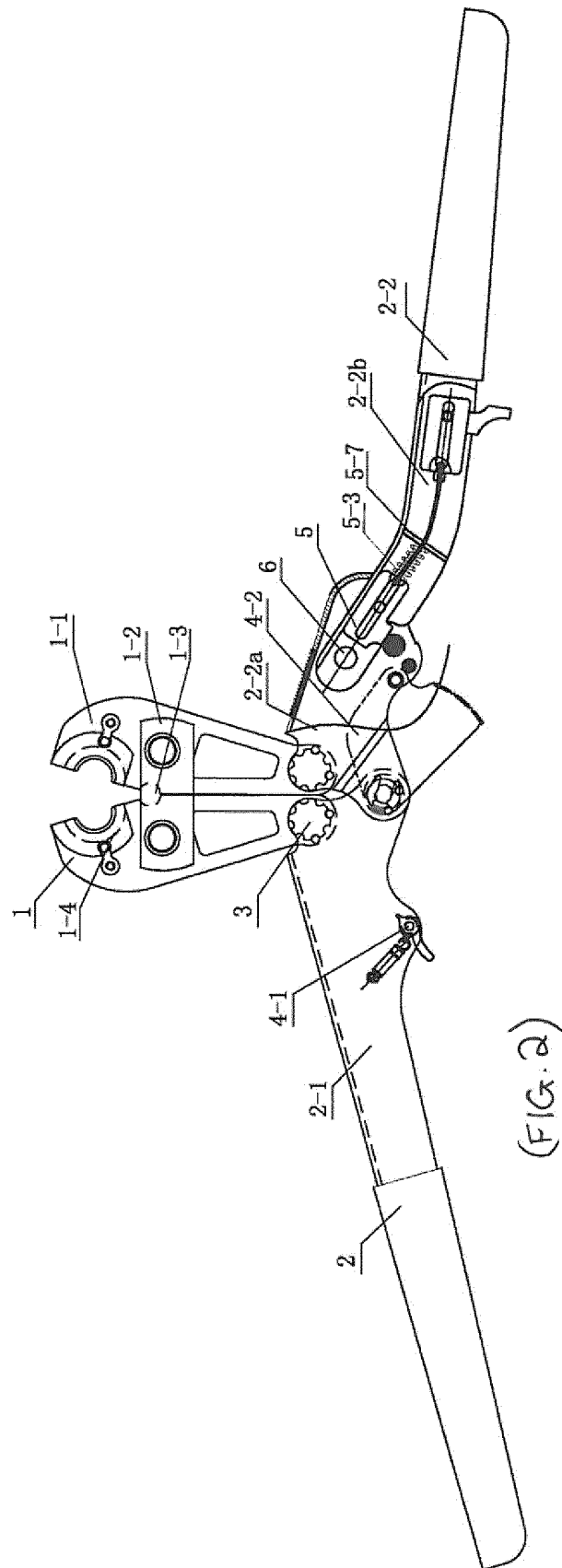
As shown in FIG. 2, FIG. 3 and FIG. 4, when the clamping tool is in the initial opening state (FIG. 2), as the opening angle of the clamp handle 2 is too large, without the angle adjustment mechanism, a significant amount of force must be exerted by the hands holding the clamp handle to close the clamp handle. At this time, pushing the adjustment handle 5-1b and pulling down the handle slider 5-5, the main slider 5-1 driven by the steel wire rope 5-6 is detached from the side contact with the positioning pin shaft 5-4, which just falls at the groove on the right clamp handle and the main slider. Then through rotating the right clamp handle, the opening angle thereof can be decreased (FIG. 3). At this point, a force can then be easily applied to the clamp handle that has rotated with an angle to close the clamp handle through a step-by-step action of the ratchet. When the clamp handle is closed to a position where the two hands are about to touch each other (FIG. 4, position A), the right clamp handle is rotated outwardly. At this time, under the action of the compression spring 5-3, the main slider springs upwardly and the positioning pin shaft contacts the side of the main slider, which in turn makes the clamp handle open with a certain angle (FIG. 4, position B). The force application is again continued, and the fastener 8 under the clamping force makes the pipe joint 10 and pipe 9 be tightly coupled, then a connection operation may be completed. The present clamping tool is simple to operate and time-and-labor saving, which improves the efficiency of installation and construction.

Claims

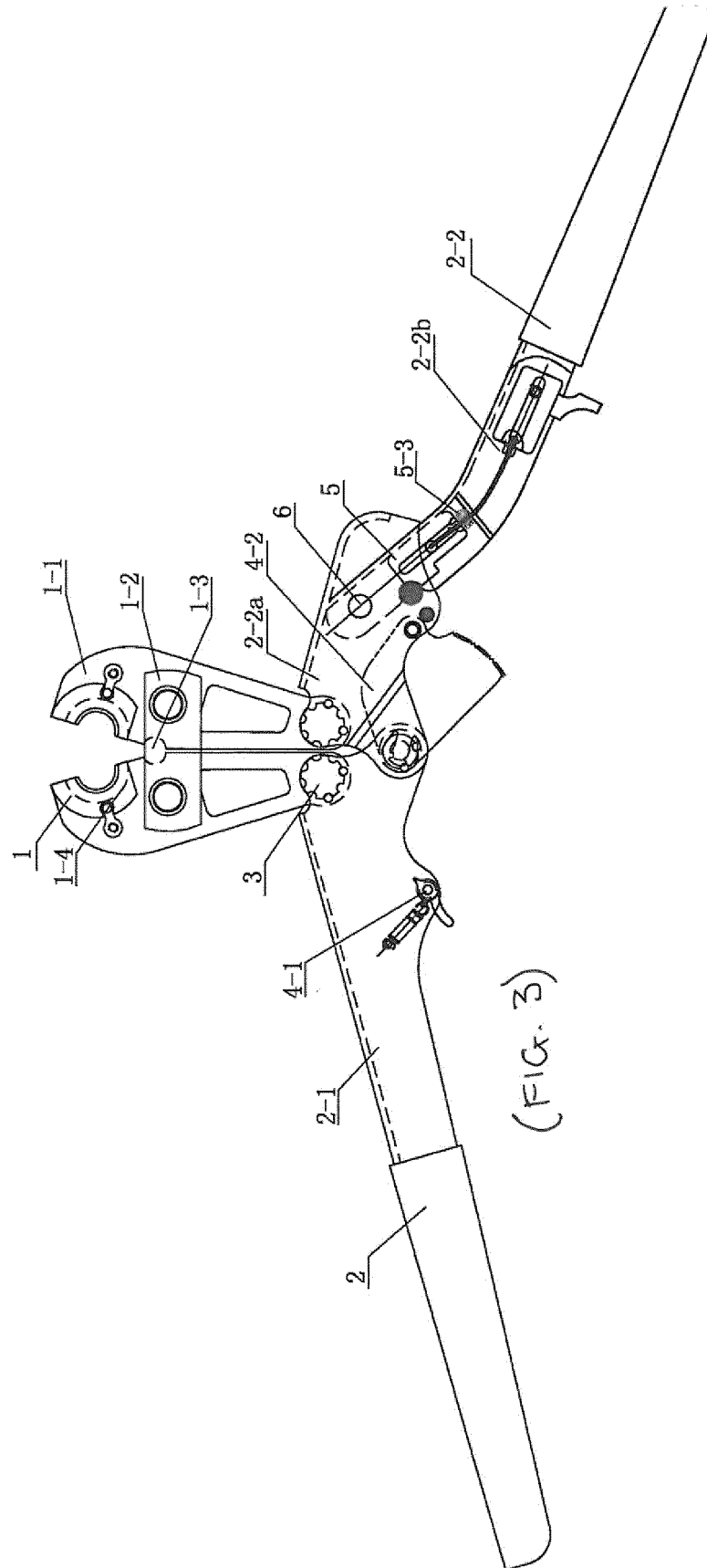
1. A manual clamping tool capable of changing a clamp handle angle comprising a working head, a clamp handle and an adjustment structure; the working head being formed by connecting a clamp head and a positioning shaft through a cover plate, a replaceable opening mould being installed on the clamp head, the clamp handle comprising a left clamp handle and a right clamp handle, wherein a ratchet retaining mechanism is installed on the clamp handle, and the ratchet retaining mechanism comprises: a ratchet plate installed at an upper clamp handle of the right clamp handle and a ratchet installed on the left clamp handle; the right clamp handle comprises the upper clamp handle and a lower clamp handle movably connected to the upper clamp handle through a rotating shaft, and a clamp handle angle adjustment mechanism is installed on the right clamp handle. 5 10 15 20
2. The manual clamping tool capable of changing a clamp handle angle according to claim 1, wherein the clamp handle angle adjustment mechanism comprises: a slider component, a guide pin shaft, a compression spring and a positioning pin shaft used for the adjustment of dominant angle of the right clamp handle; the slider component consists of a main slider, a steel wire rope and a handle slider; the slider component, which is movably connected to the lower clamp handle through the guide pin shaft, is disposed within a U-shaped slot of the lower clamp handle of the right clamp handle; the positioning pin shaft is installed on the upper clamp handle of the right clamp handle; the compression spring is nested inside the steel wire rope, with one end of the compression spring connected to the main slider, and the other end abutting the spring plank. 25 30 35
3. The manual clamping tool capable of changing a clamp handle angle according to claim 2, wherein the main slider and the handle slider are in the shape of a following-the-right-clamp-handle type and installed within the right clamp handle, a guide groove is formed on the main slider and the handle slider, through which the main slider and the handle slider slide under the action of the guide pin shaft, an adjustment handle suitable for being pulled by the human hand is formed on the lower part of the outer end of the handle slider, and a groove facilitating the adjustment of the angle of the right clamp handle is formed on the upper part of the main slider. 40 45 50
4. The manual clamping tool capable of changing a clamp handle angle according to claim 1, wherein the lower end of the upper clamp handle of the right clamp handle is made into a bend stop part to prevent the clamp handle from opening with a too large angle. 55
5. The manual clamping tool capable of changing a clamp handle angle according to claim 4, wherein a circular arc groove is formed on the side of the lower clamp handle of the right clamp handle to avoid an acting force produced by the guide pin shaft.
6. The manual clamping tool capable of changing a clamp handle angle according to claim 5, wherein an outward bending part is formed on the lower clamp handle of the right clamp handle.

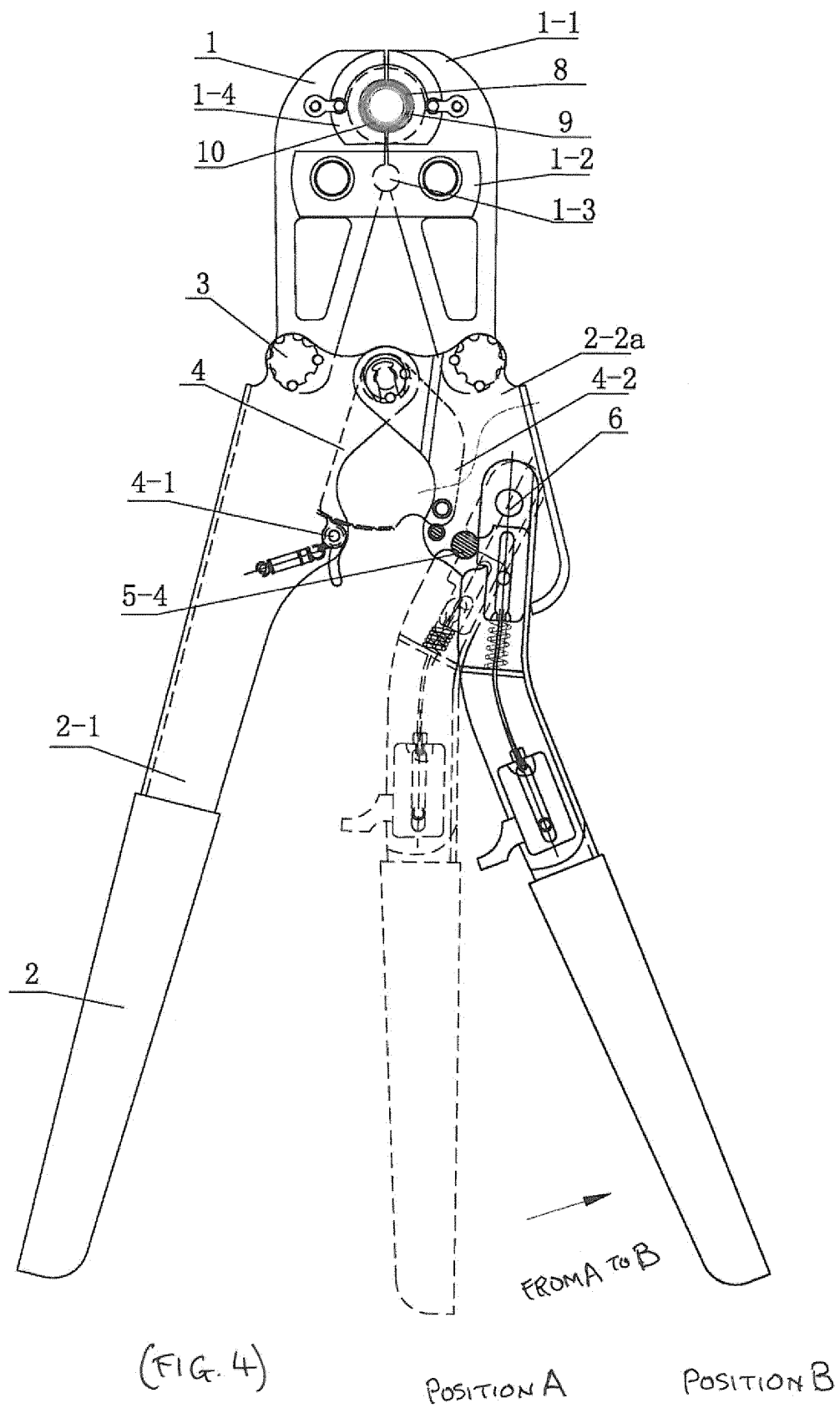


(FIG. 1)



(FIG. 2)





INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2011/082154

A. CLASSIFICATION OF SUBJECT MATTER

See the extra sheet

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC:B25B 7/-, B25B 27/-, B25B 13/-, B25G 1/-, B25B 5/-, B25B 3/-, B26B 13/-, B23D 21/-, B25B 9/

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNPAT, EPODOC, WPI: click pulley, notch wheel, paw wheel, ratchet wheel, angle, corner, vice, clamp, adjust, adjustment

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

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“A” document defining the general state of the art which is not considered to be of particular relevance	“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
“E” earlier application or patent but published on or after the international filing date	“Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
“L” document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	“&” document member of the same patent family
“O” document referring to an oral disclosure, use, exhibition or other means	
“P” document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

17 Apr.2012 (17.04.2012)

Date of mailing of the international search report

03 MAY.2012 (03.05.2012)

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2011/082154

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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Form PCT/ISA /210 (continuation of second sheet) (July 2009)

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International application No.

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2011/082154

Continuation of : second sheet A. CLASSIFICATION OF SUBJECT MATTER

B25B 7/12 (2006.01) i

B25B 5/14 (2006.01) i

B25B 5/16 (2006.01) i