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(54) **LOCKING PLIERS**

(57) Locking pliers according to an embodiment of the present disclosure can be easily unlocked by pressing a pressing unit of an opening lever with a thumb while gripping the levers with one hand. The locking pliers and can give tension to an object by pulling the object through the principle of leverage.

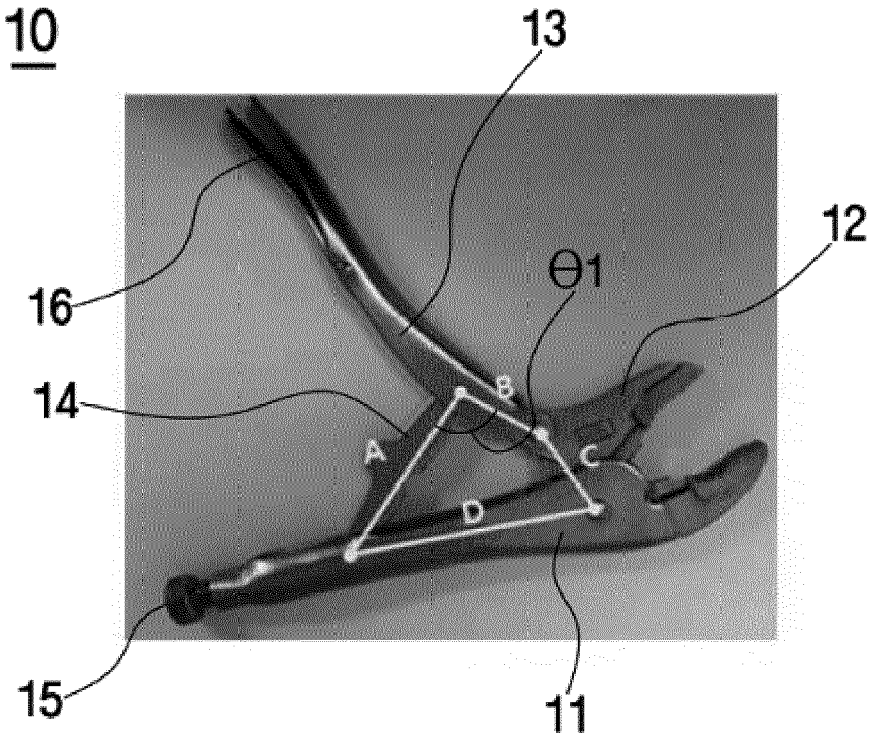

FIG. 1

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Description

BACKGROUND OF THE INVENTION

Field of the invention

[0001] The present disclosure relates to locking pliers and, more particularly, to locking pliers having a structure by which the locked position of the locking pliers may be simply released by pressing a pressing portion of an opening lever with the thumb of one hand while levers of the locking pliers are being held with one hand, and an object may be drawn and tensioned according to the lever principle. The locking pliers, a type of tool, according to the present disclosure has industrial applicability.

Related Art

[0002] Locking pliers are tools configured to be locked into position while holding an object.

[0003] Locking pliers were invented by IRWIN Company in the USA in 1924 and commercially distributed with a tradename Vise-Grip. At present, Vise-Grip is being widely sold by IRWIN Company.

[0004] FIG. 1 is a view illustrating the unfastened position (i.e., unlocked position) of typical locking pliers, and FIG. 2 is a view illustrating the fastened position (i.e., the locked position) of typical locking pliers.

[0005] Referring to FIGS. 1 and 2, typical locking pliers 10 include a fixing lever 11, a pivot jaw 12 hinged to the fixed lever 11 such that a distal end of the pivot jaw 12 may pivot toward a distal end of the fixed lever to hold an object, a movable lever 13 hinged to the pivot jaw 12 to pivot the pivot jaw 12 when pressed, and an adjustment bar 14 with one end thereof being hinged to the movable lever 13 and the other end thereof being hinged to an adjustment bolt 15 provided on the fixed lever 11. When the movable lever 13 is pressed, the adjustment bar 14 fixes the pressed position.

[0006] In addition, when an unlocking lever 16 is pressed in the fastened position as illustrated in FIG. 2, the unlocking lever 16 presses the adjustment bar 14 to move the movable lever 13 away from the fixed lever 11 so that the distance between the movable lever 13 and the fixed lever 11 is widened, so that the fastened position is released.

[0007] Furthermore, the locking pliers 10 use a toggle mechanism having a structure comprised of four links A, B, C, and D. When in the unfastened position as in FIG. 1, the angle $\theta 1$ between the link A and the link B is about 90°. When the locking pliers are pressed so that the angle $\theta 2$ the link A and the link B is equal to or less than 180°, the fastening is accomplished.

[0008] In addition, in the typical locking pliers 10, it is impossible to accomplish unfastening with one hand holding the locking pliers 10 since the unlocking lever 16 is hinged to the inner portion of the movable lever 13. The unlocking lever 16 must be pressed with the other hand to accomplish the unfastening. Thus, it is difficult to use locking pliers in some operations, such as an operation of drawing canvas and fixing the canvas to a signboard frame, in which fastening and unfastening must be performed rapidly.

[0009] In addition, when an object such as a sheet of canvas is pulled, an object may be caught into a coupling gap of the pivot jaw 12 in the general locking pliers 10, and a part of the object may be damaged, which challenges an operator to work.

[Related Art Document]

[Patent Document]

[0010]

(Patent Document 1) Korean Patent No. 10-0729179, entitled "SIGNBOARD FRAME CLOTH FIXING DEVICE"
(Patent Document 2) Korean Published Utility Model No. 20-2014-000466, entitled "VICE PLIERS"
(Patent Document 3) Korean Patent No. 10-0713559, entitled "VICE PLIERS"

SUMMARY OF THE INVENTION

[0011] Accordingly, the present disclosure has been made keeping in mind the above problems occurring in the prior art, and an objective of the present disclosure is to provide locking pliers having a structure by which locking and unlocking operations may be performed rapidly in a simple manner with one hand by pressing an opening lever with the thumb of one hand holding levers of the locking pliers.

[0012] Another objective of the present disclosure is to provide locking pliers having a structure by which an object may be drawn and tensioned according to the lever principle.

[0013] In addition, the present disclosure provides locking pliers capable of preventing that an object is partly damaged as the object is caught between the pivot jaw a coupling gap of the pivot jaw when the object such as a sheet of canvas is pulled.

[0014] In order to accomplish the above objective, the present disclosure provides locking pliers including a fixed lever, a pivot jaw hinged to the fixed lever such that a distal end of the pivot jaw pivots toward a distal end of the fixed lever to hold an object, a movable lever hinged to the pivot jaw to pivot the pivot jaw when pressed, and an adjustment bar having one end thereof being hinged to the movable lever and the other end thereof being hinged to an adjustment bolt provided on the fixed lever, wherein, when the movable lever is pressed, the adjustment bar fixes the movable lever in a pressed position. The locking pliers may further include a bar-shaped opening lever hinged to the adjustment bar instead of the movable lever so as to be pivotable, the opening lever

comprising a front portion and a rear portion on both sides of a hinge shaft, the front portion facing the pivot jaw. A bottom of the fixed lever may be covered with four fingers except for the thumb and the thumb may be placed on top of the movable lever to use the locking pliers in a position in which the fixed lever is located below while the movable lever is located above. A pressing portion may be provided on the front portion. The pressing portion may be configured to be pressed with the thumb of a hand holding the fixed lever and the movable lever. The rear portion may be in contact with the movable lever when a locked position is accomplished when the movable lever is pressed and push the movable lever upward from a side of the fixing lever to release the locked position when the pressing portion is pressed in a direction from the movable lever to the fixed lever.

[0015] In an exemplary embodiment, an unlocking lever may be provided on and hinged to the movable lever, the unlocking lever being configured such that one end thereof is in contact with the adjustment bar when in the locked position and presses the adjustment bar when the other end thereof is pressed so that the movable lever is moved away from the adjustment bar to release the locked position. The rear portion of the opening lever may be in contact with one end of the unlocking lever when in the locked position and moves one end of the unlocking lever away from the adjustment bar to release the locked position when the pressing portion is pressed at a distal end of the fixed lever and a distal end of the pivot jaw, engagement pads each having a predetermined area and holding an object may be provided.

[0016] The locking pliers include an elastic prevention portion to prevent that the object is damaged as the object is caught between the pivot jaw and a coupling gap of the pivot jaw in a state in which the engagement pads holds the object.

[0017] In an exemplary embodiment, engagement pads may be provided on a distal end of the fixed lever and a distal end of the pivot jaw, the engagement pads having predetermined areas and being configured to hold an object. The fixed pad may include a lever pad configured to be supported and rotated on a bottom of a fixed structure to draw the object according to lever principle while the object is being held by the engagement pads.

[0018] The lever pad may include a pad extension pivotably coupled to one side of a distal end in a direction to be supported on a bottom of the fixed structure, the pad extension extended by a predetermined length in a direction toward the fixed structure so that the support by the fixed structure is prevented from being released.

[0019] One side of the pad extension may be pivotably coupled to a distal end of the lever pad according to whether the movable lever is locked, and the other side of the pad extension may be pivotably coupled to the fixed lever.

[0020] The pad extension may be bolt-fastened to one side of the lever pad and one side of the fixed lever to adjust and fix a pivotably coupled state.

[0021] As described above, the present disclosure has the following excellent effects.

[0022] First, in the locking pliers according to the present disclosure, there are advantages in that the fastening may be accomplished by holding both the fixed lever and the movable lever with one hand and the unfastening may be accomplished rapidly and simply by pressing the opening lever with the thumb of one hand holding the fixed lever and the movable lever.

[0023] In addition, in the locking pliers according to the present disclosure, the lever pad may be supported and rotated on the bottom of a fixed structure to draw an object according to the lever principle, thereby applying tension to the object. It is significantly effective in an operation of fixing canvas or the like to a signboard frame by tensioning the canvas.

[0024] In addition, according to the locking pliers of the present disclosure, it is possible to prevent a part of an object from being damaged as caught in a coupling gap of a pivot jaw when the object such as a sheet of canvas is pulled.

Brief Description of the Drawings

[0025]

FIG. 1 is a view illustrating the unfastened position of typical locking pliers;

FIG. 2 is a view illustrating the fastened position of typical locking pliers;

FIG. 3 is a view illustrating the fastening position of locking pliers according to an embodiment of the present disclosure; and

FIG. 4 is a view illustrating the unfastened position of thelocking pliers according to the embodiment of the present disclosure.

FIG. 5 is a view illustrating a state in which a pad extension of locking pliers according to an embodiment of the present disclosure is fastened.

Description of the Reference Numerals in the Drawings

[0026]

10: locking pliers of the related art 11: fixed lever
12: pivot jaw 13: movable lever
14: adjustment bar 15: adjustment bolt
16: unlocking bar
100: locking pliers according to the present disclosure 110: opening lever
111: hinge shaft 112: front portion
113: rear portion 114: pressing portion
120, 120a: engagement pad 130: lever pad 131: pad extension
140: handle fence 150: elastic prevention portion

DESCRIPTION OF EXEMPLARY EMBODIMENTS

[0027] Terms used herein are selected to be as general terms as possible that are widely used at present but some terms are designated by the applicant for specific cases. The terms designated by the applicant should be interpreted in consideration of the meanings of the terms described or used in the detailed description, not by the names of the terms.

[0028] Hereinafter, the technical configuration of the present disclosure will be described in detail with reference to exemplary embodiments illustrated in the accompanying drawings.

[0029] However, the present disclosure is not limited to embodiments described hereinafter and may be implemented in other forms. Throughout the specification, the same reference numerals are used to indicate the same components.

[0030] FIG. 3 is a view illustrating the fastening position of locking pliers according to an embodiment of the present disclosure, and FIG. 4 is a view illustrating the unfastened position of the locking pliers according to the embodiment of the present disclosure, and FIG. 5 is a view illustrating a state in which a pad extension of locking pliers according to an embodiment of the present disclosure is fastened.

[0031] Referring to the figures, locking pliers 100 according to an embodiment of the present disclosure are a tool configured to hold or release an object 1 using a toggle mechanism having a four-link structure. In particular, the locking pliers 100 are especially useful for a signboard assembly operation of tensioning a sheet of canvas by drawing the canvas to a signboard frame and then repeating stapling.

[0032] The locking pliers 100 include a fixed lever 11, a pivot jaw 12, a movable lever 13, an adjustment bar 14, an adjustment bolt 15, an unlocking lever 16, and an opening lever 110. The locking pliers 100 may further include engagement pads 120 and 120a, a lever pad 130, and a handle fence 140.

[0033] In addition, the fixed lever 11, the pivot jaw 12, the movable lever 13, the adjustment bar 14, the adjustment bolt 15, and the unlocking lever 16 are substantially the same as the fixed lever 11, the pivot jaw 12, the movable lever 13, the adjustment bar 14, the adjustment bolt 15, and the unlocking lever 16 of the typical locking pliers 10 illustrated in FIGS. 1 and 2, and detailed descriptions thereof will be omitted.

[0034] The opening lever 110 having the shape of a bar may be hinged to a side surface of the adjustment bar 14 so as to be pivotable. The opening lever 110 includes a front portion 112 and a rear portion 113 on both sides of a hinge shaft 111, with the front portion 112 facing the pivot jaw 12.

[0035] In addition, the opening lever 110 may be hinged to any side, i.e., the left side or the right side, of the adjustment bar 14 according to the physical characteristics of a user and the purpose of an operation.

[0036] In addition, the front portion 112 is longer than the rear portion 113. A pressing portion 114 is provided on a distal end of the front portion 112 and has a predetermined 15 area allowing the user holding the fixed lever 11 and the movable lever 13 to press the pressing portion 114 with the thumb.

[0037] In addition, a distal end of the rear portion 113 is in contact with one end of the unlocking lever 16. When the 20 pressing portion 114 is pressed, the distal end of the rear portion 113 pushes one end of the unlocking lever 16 to move the movable lever 13 away from the adjustment bar 14 so that the distance between the movable lever 13 and the adjustment bar 14 is widened, thereby releasing the locking.

[0038] In addition, the front portion 112 is longer than the rear portion 113 such that the unlocking lever 16 may be pushed upward with a relatively small amount of force.

[0039] In the locking pliers 100, although the unlocking lever 16 is not separately provided, the rear portion 113 of the opening lever 110 may be directly in contact with the movable lever 13 to move the movable lever 13 away from the fixed lever 11 to release the fastening. Thus, the unlocking lever 16 may be selectively provided.

[0040] Thus, there is an advantage in that the locking and the unlocking of the locking pliers may be performed rapidly in an operation by pressing the pressing portion 114 with the thumb of one hand holding the locking pliers, differently from the typical locking pliers 10 in which the movable lever 13 and the fixed lever 11 must be held with one hand while the unlocking lever 16 are being pressed with the other hand in order to release the locking.

[0041] The engagement pads 120 and 120a respectively having a predetermined area are provided on distal ends of the pivot jaw 12 and the fixed lever 11 configured to directly hold the object 1, and serve to help the object 1 be reliably held.

[0042] Since the engagement pads 120 and 120a respectively have the predetermined area, it is significantly effective when the object 1 is a thin and flexible object, such as a film or cloth.

[0043] In addition, a prevention pad (not shown) may be provided so that, in a case where the object 1 is of thin and flexible material, the object 1 is prevented from being pushed, torn, or wrinkled when the engagement pads 120 and 120a holds the object 1.

[0044] Such a prevention pad (not shown) may be of a material having elasticity, such as silicone, rubber, and the like.

[0045] Meanwhile, the locking pliers 100 may include an elastic prevention portion 150 to prevent the object 1 from being damaged as caught between the pivot jaw 12 and a coupling gap of the pivot jaw 12 when the engagement pads 120 and 120a of the locking pliers 100 hold the object deeply.

[0046] In this case, the elastic prevention portion 150 may have elasticity and may be bent or folded in a direction toward the object 1 or in the opposite direction to the

object 1 due to the elasticity.

[0047] In addition, the elastic prevention portion 150 may be stretched due to the elasticity depending on whether the engagement pads 120 and 120a are used, and the stretched elastic prevention portion 150 may be restored to an original state thereof depending on whether the engagement pads 120 and 120a are used.

[0048] That is, when the engagement pads 120 and 120a are open, the elastic prevention portion 150 may be stretched due to the elasticity, and when the engagement pads 120 and 120a holds the object, the elastic prevention portion 150 stretched as the engagement pads 120 and 120a are open may be restored to the original state thereof.

[0049] That is, whether the engagement pads 120 and 120a are used depends on an operation state of the fixed lever 11 and the movable lever 130.

[0050] In addition, the elastic prevention portion may be rubber. In addition, although not illustrated, a spring may be mounted in the elastic preventing portion 150 so that the elastic preventing portion 150 may properly function even if the rubber is damaged.

[0051] Furthermore, the lever pad 130 is provided on the fixed lever 11 while being spaced apart from the bottom end of the engagement pad 120a of the fixed lever 11 by a predetermined distance. The lever pad 130 may be supported on the bottom of a fixed structure 2 and be rotated in a direction 'r' to draw the object 1 according to the lever principle, thereby applying tension to the object 1.

[0052] The lever pad 130 is very effective when the object 1 applies tension to the canvas or the like used in the construction of a signboard.

[0053] In addition, the lever pad 130 may further include a pad extension 131.

[0054] In this case, the pad extension 131 may be pivotably coupled at one side of a distal end of the lever pad 130 in a direction to be supported on a bottom of the fixed structure, and in order to prevent separation from the bottom of the fixed structure 2 when the distal end of the lever pad 130 supports the bottom of the fixed structure 2, the pad extension part 131 may be extended by a predetermined length in a direction toward the fixed structure 2.

[0055] That is, in a case where the lever 130 supports the bottom of the fixed structure 2, even if the fixed structure 2 slips due to a material of the bottom of the fixed structure 2, the pad extension 13 extended from the lever pad 130 may receive tension and rotate the fixed structure 2, so that the support by the lever pad 130 is prevented from being released.

[0056] In addition, one side of the pad extension 131 may be pivotably coupled to a distal end of the lever pad 130 depending on whether the movable lever 13 is locked, and the other side of the pad extension 131 may be pivotably coupled to the fixed lever 11.

[0057] In addition, the pad extension 131 may be bolt-fastened to the lever pad 130 and the fixed lever so that a pivoted state of the pad extension 131 is fixed or released.

[0058] That is, when the pad extension 131 is not used, the pad extension 131 may be firmly bolt-fastened to the fixed lever 11 so as not to be pivoted.

[0059] In addition, when the pad extension 131 is used, the pad extension 131 may be bolt-fastened to the lever pad 130 and a pivot direction of the pad extension 131 may be adjusted by releasing a bolt and then the adjusted pivot direction may be fixed by firmly fastening the bolt.

[0060] The handle fence 140 is a rim-shaped structure provided on the bottom of the fixed lever 11, and has a size accommodating four fingers except for the thumb. The handle fence 140 serves to prevent the locking pliers 100 from being released from the hand during an operation.

[0061] Although the exemplary embodiment of the present disclosure has been described for illustrative purposes, those skilled in the art will appreciate that the foregoing embodiment is not limitative and various modifications and alterations are possible without departing from the scope and spirit of the present disclosure.

[0062] On the other hand, when the opening and closing of the locking pliers 100 is operated by operating the opening lever 110, the auto lever (not shown) is formed in the '⊥⊥' direction, and after opening and closing, the screw part automatically pushes the opening lever 110. can come up

[0063] That is, the auto lever may be coupled to one side of the control bar 14 to operate the opening and closing of the locking pliers 100 according to the operation of the opening lever 110.

[0064] In this case, the adjustment bar 14 may be coupled to the fixing lever 11 .

Claims

1. Locking pliers comprising a fixed lever, a pivot jaw hinged to the fixed lever such that a distal end of the pivot jaw pivots toward a distal end of the fixed lever to hold an object, a movable lever hinged to the pivot jaw to pivot the pivot jaw when pressed, and an adjustment bar having one end thereof being hinged to the movable lever and the other end thereof being hinged to an adjustment bolt provided on the fixed lever, the adjustment bar fixing the movable lever in a pressed position when the movable lever is pressed,
   wherein the locking pliers further comprise:

   a bar-shaped opening lever hinged to the adjustment bar instead of the movable lever so as to be pivotable, the opening lever comprising a front portion and a rear portion on both sides of a hinge shaft, the front portion facing the pivot jaw, wherein a bottom of the fixed lever is covered with four fingers except for the thumb and

the thumb is placed on top of the movable lever to use the locking pliers in a position in which the fixed lever is located below while the movable lever is located above; and

a pressing portion is provided on the front portion, the pressing portion being configured to be pressed with the thumb of a hand holding the fixed lever and the movable lever, and the rear portion is in contact with the movable lever when a locked position is accomplished when the movable lever is pressed and pushes the movable lever upward from a side of the fixing lever to release the locked position when the pressing portion is pressed in a direction from the movable lever to the fixed lever,

wherein engagement pads each having a predetermined area and holding an object are provided at a distal end of the fixed lever and a distal end of the pivot jaw, and

wherein the locking pliers comprises an elastic prevention portion to prevent the object from being damaged as caught between the pivot jaw and a coupling gap of the pivot jaw in a state in which the engagement pads hold the object.

2. The locking pliers according to claim 1, wherein an unlocking lever is provided on and hinged to the movable lever, the unlocking lever being configured such that one end thereof is in contact with the adjustment bar when in the locked position and presses the adjustment bar when the other end thereof is pressed so that the movable lever is moved away from the adjustment bar to release the locked position; and

the rear portion of the opening lever is in contact with one end of the unlocking lever when in the locked position and moves one end of the unlocking lever away from the adjustment bar to release the locked position when the pressing portion is pressed.

3. The locking pliers according to claim 1 or 2, wherein engagement pads are provided on a distal end of the fixed lever and a distal end of the pivot jaw, the engagement pads having predetermined areas and being configured to hold an object; and the fixed pad comprises a lever pad configured to be supported and rotated on a bottom of a fixed structure to draw the object according to lever principle while the object is being held by the engagement pads.

4. The locking pliers of claim 3,

wherein the lever pad comprises a pad extension pivotably coupled to one side of a distal end in a direction to be supported on a bottom of the fixed structure, the pad extension extended by a predetermined length in a direction toward the fixed structure so that the support by the fixed structure is prevented from being released,

wherein one side of the pad extension is pivotably coupled to a distal end of the lever pad according to whether the movable lever is locked, and the other side of the pad extension is pivotably coupled to the fixed lever, and

wherein the pad extension is bolt-fastened to one side of the lever pad and one side of the fixed lever to adjust and fix a pivotably coupled state.

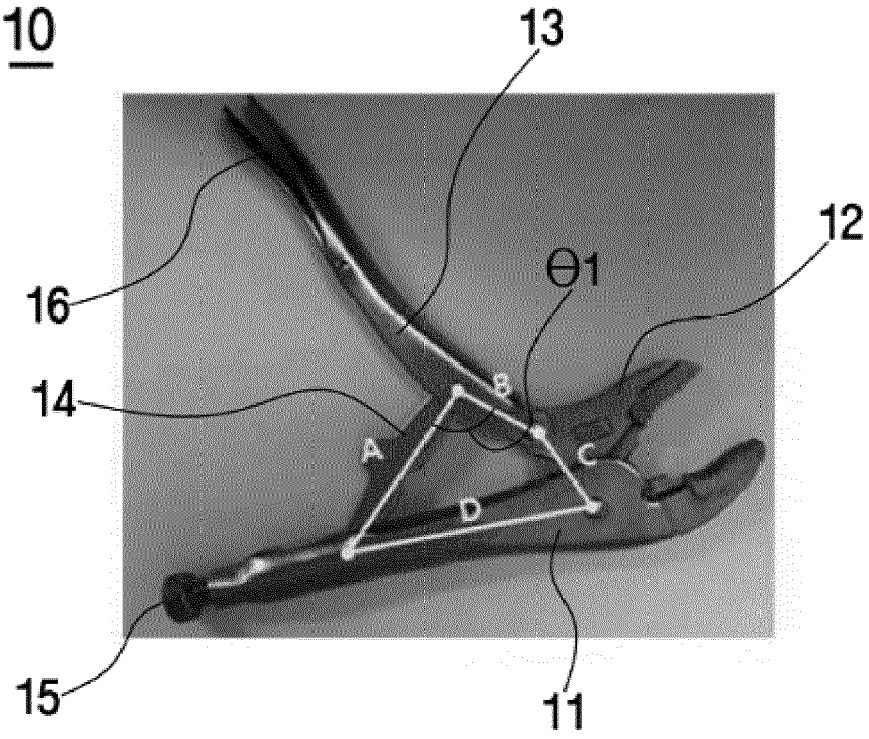

FIG. 1

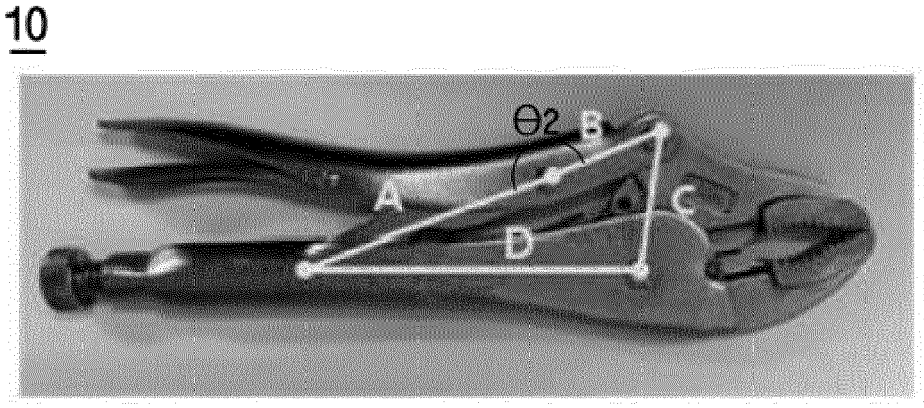

FIG. 2

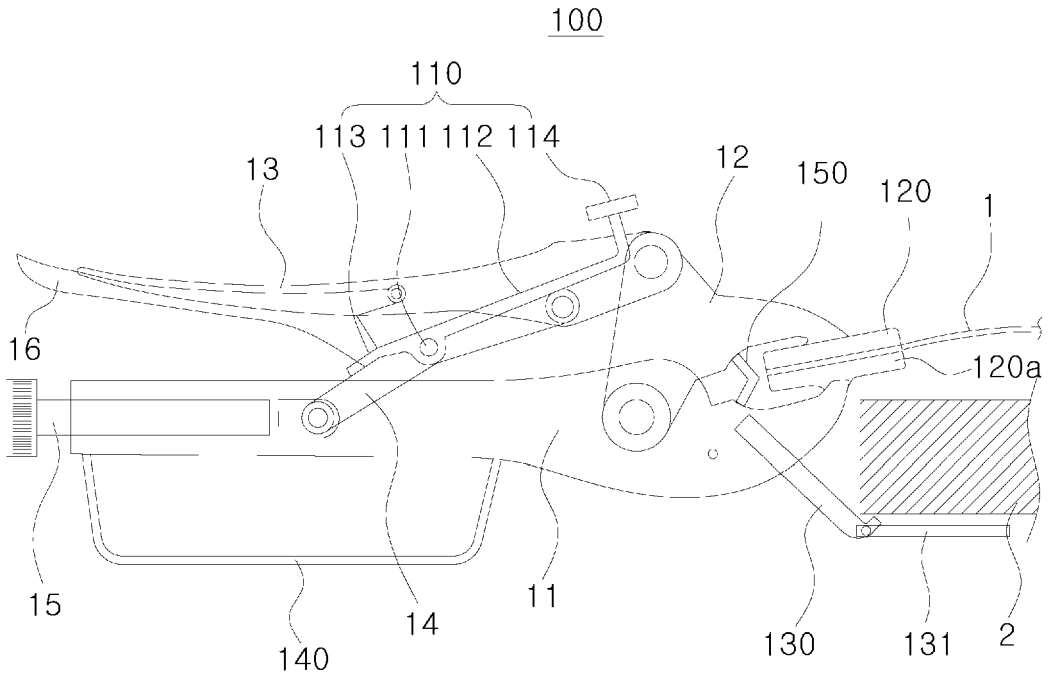
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FIG. 3

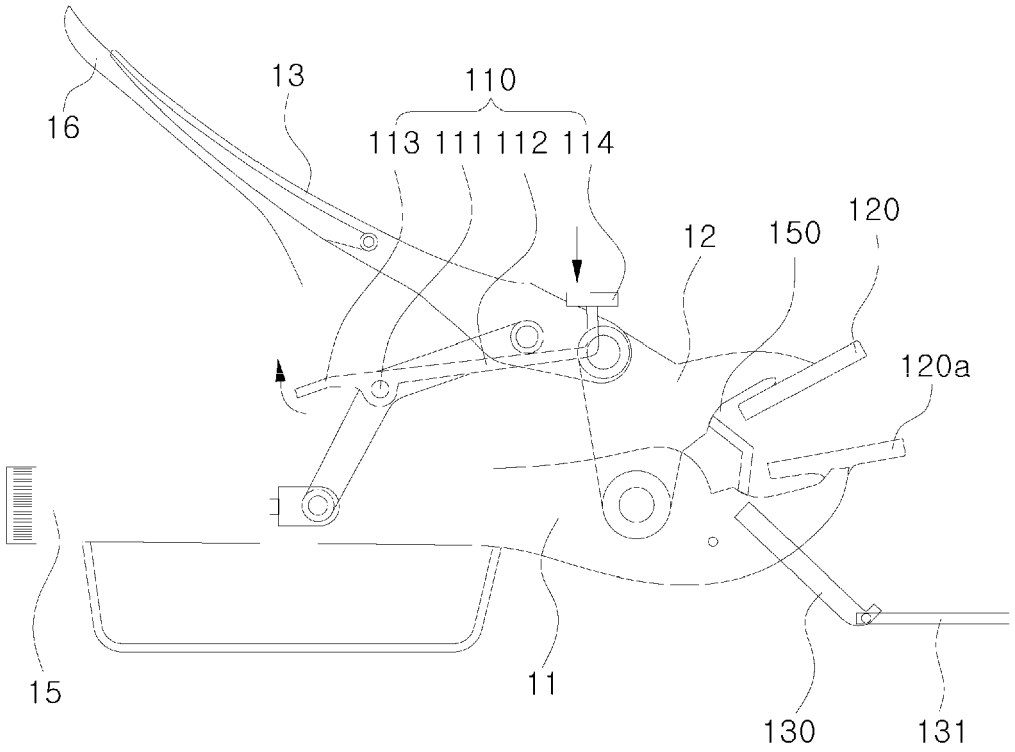
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FIG. 4

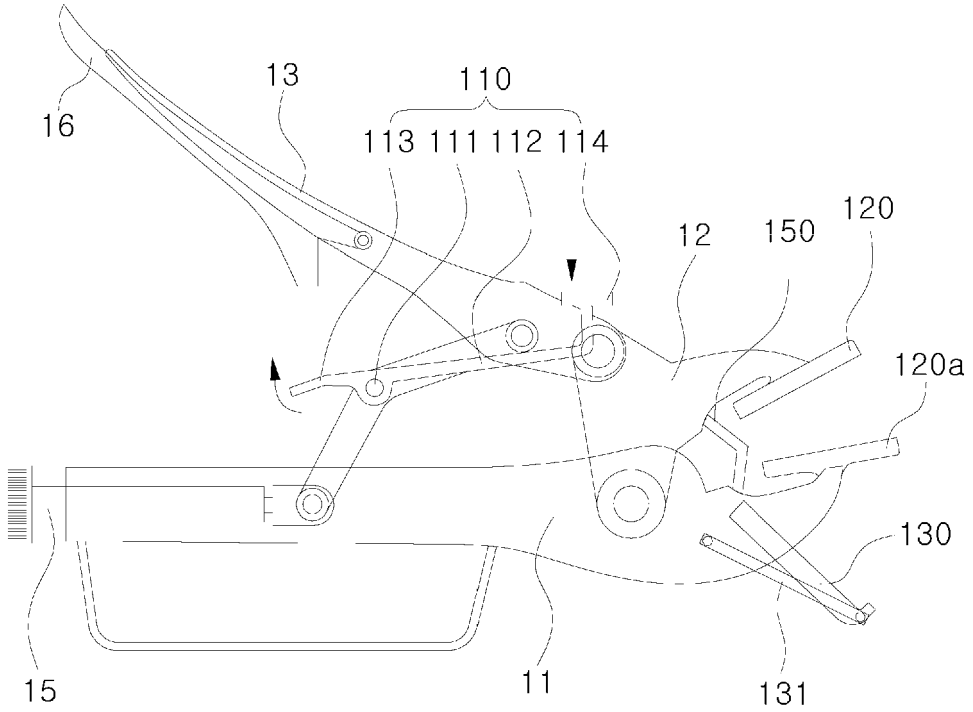

FIG. 5

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EUROPEAN SEARCH REPORT

Application Number
EP 22 16 0114

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	WO 2021/010590 A1 (LEE JONG HA [KR]) 21 January 2021 (2021-01-21) * figures 3-4 *	1-4	INV. B25B7/12
Y	WO 2015/161317 A1 (THRU TUBING SOLUTIONS INC [US]) 22 October 2015 (2015-10-22) * paragraphs [0037] - [0038]; figures 2-6 *	1-4	

TECHNICAL FIELDS SEARCHED (IPC)

B25B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	27 July 2022	Messai, Sonia

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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E : earlier patent document, but published on, or after the filing date
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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 22 16 0114

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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27-07-2022

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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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- KR 202014000466 **[0010]**
- KR 100713559 **[0010]**