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Huang

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(54) **JAW WRENCH**

(71) Applicant: **Yu-Shiang Huang**, Taichung (TW)

(72) Inventor: **Yu-Shiang Huang**, Taichung (TW)

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B25B 23/00 (2006.01)
B25B 13/50 (2006.01)

(52) **U.S. Cl.**
CPC ***B25B 13/28*** (2013.01); ***B25B 23/0028*** (2013.01); *B25B 13/5016* (2013.01)

(58) **Field of Classification Search**
CPC .. B25B 13/28; B25B 13/5016; B25B 23/0028
USPC 81/177.8, 177.6, 177.7
See application file for complete search history.

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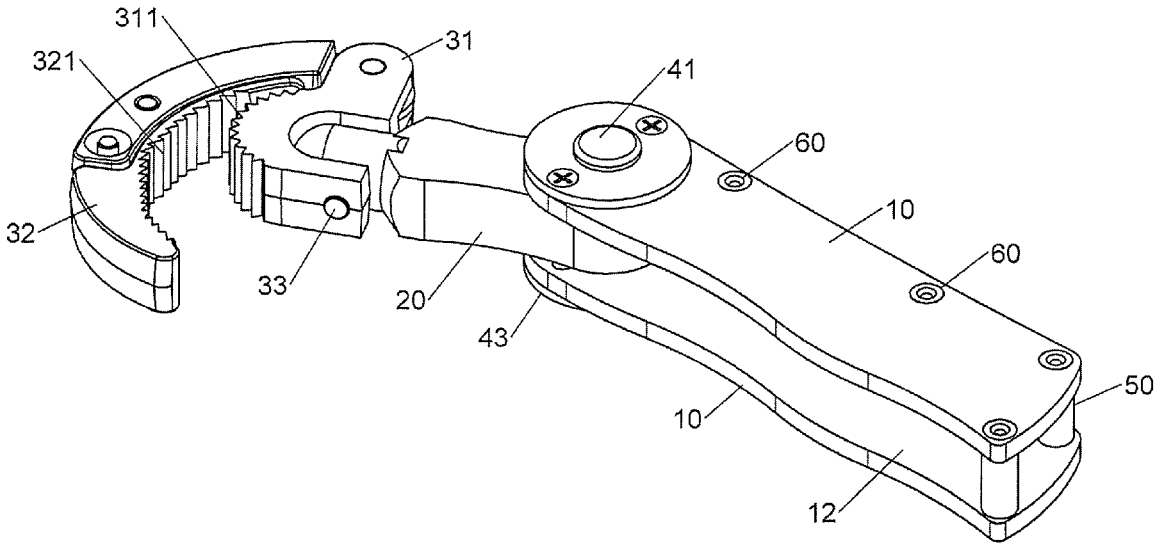
Primary Examiner — David B Thomas

(57) **ABSTRACT**

A jaw wrench includes two first bodies, a second body a function end unit and a control unit. The first bodies each have a first toothed hole. The second body has a second toothed hole. The function unit includes a third body and a fourth body pivotably connected to the third body. The third body has a first toothed portion and is connected to the second body. The fourth body has a second toothed portion. An object is clamped between the first and second toothed portions. The control unit has two control members, two second resilient members and two covers. The two control members extend into the two first and second bodies and each have a third toothed hole which is engaged with the first/second toothed hole. When the control members are pushed, the third toothed holes are disengaged from the first toothed hole.

8 Claims, 13 Drawing Sheets



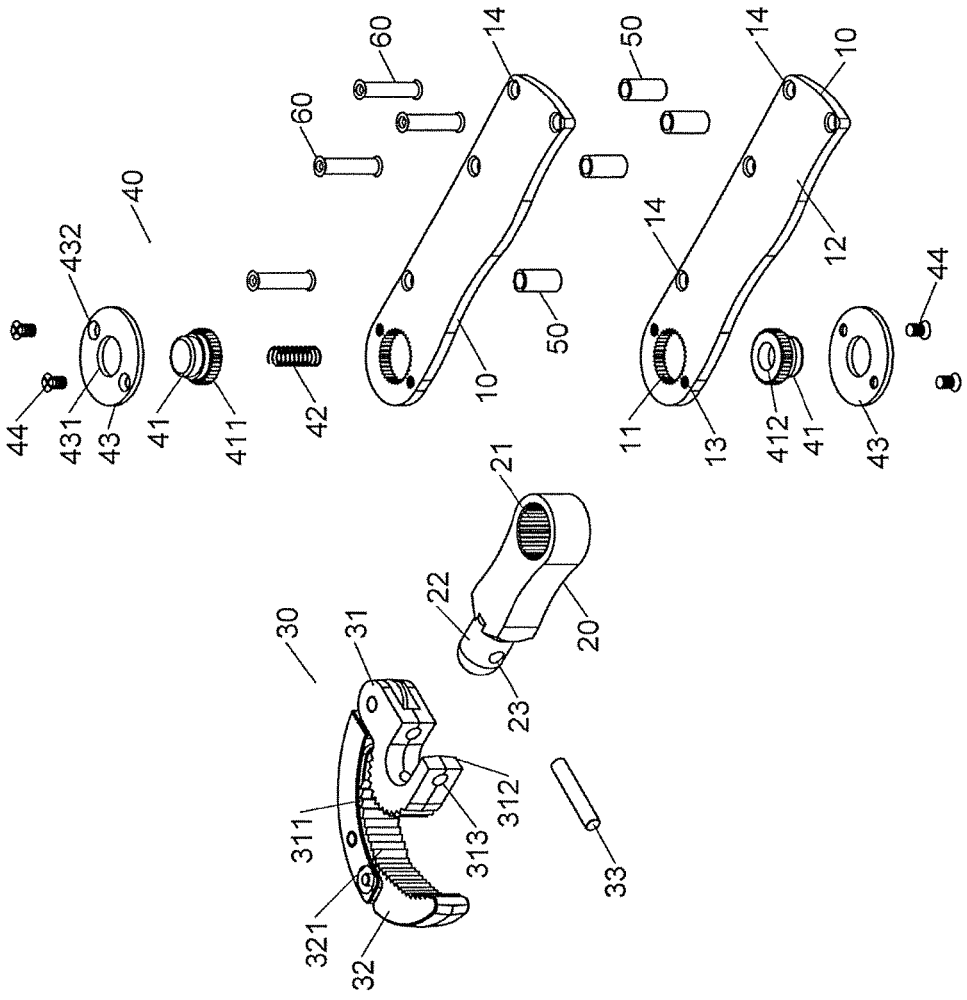

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FIG. 1

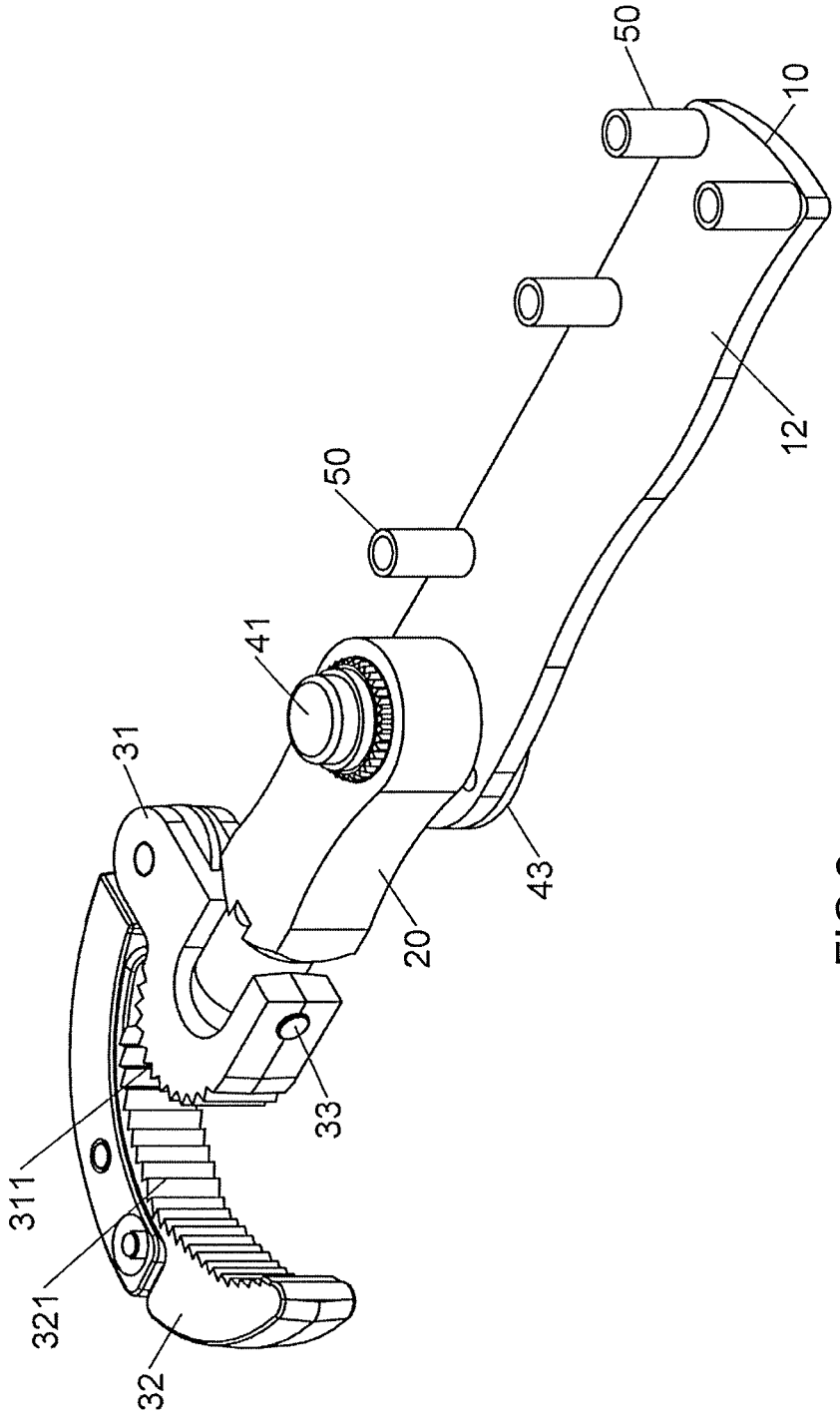

FIG.2

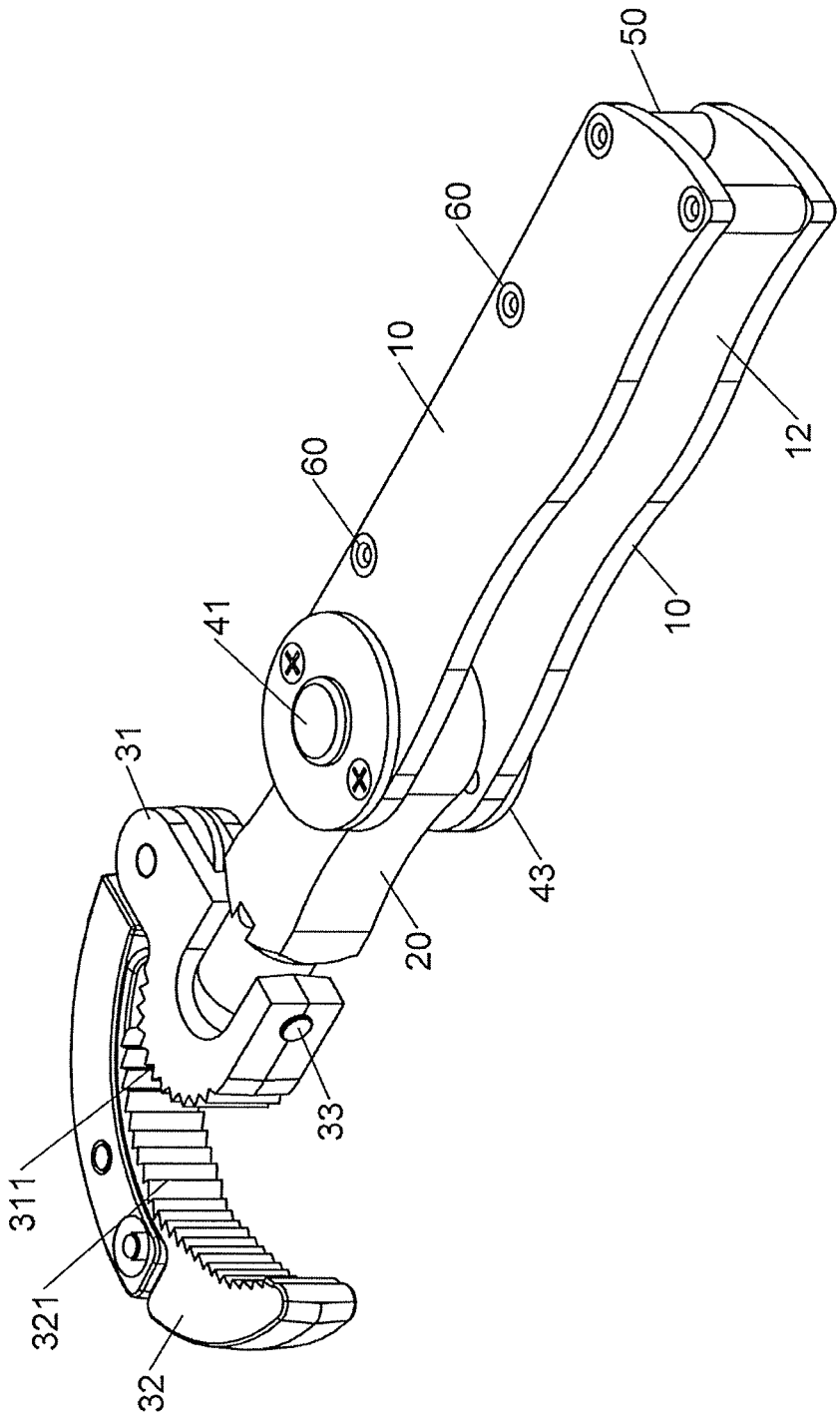

FIG.3

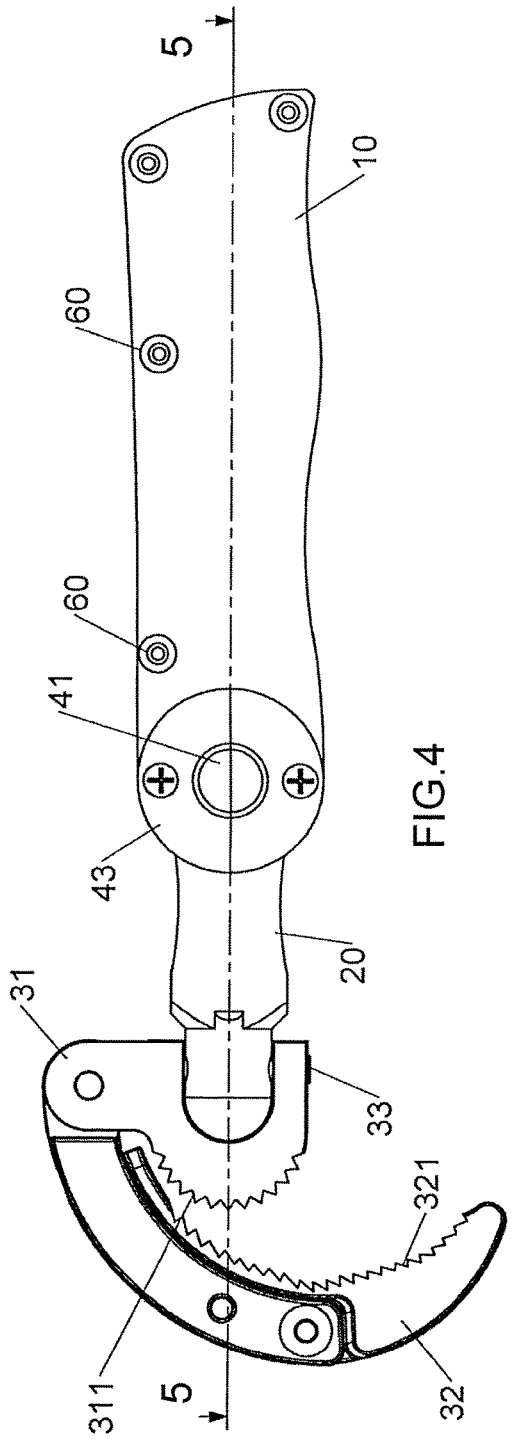
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FIG.4

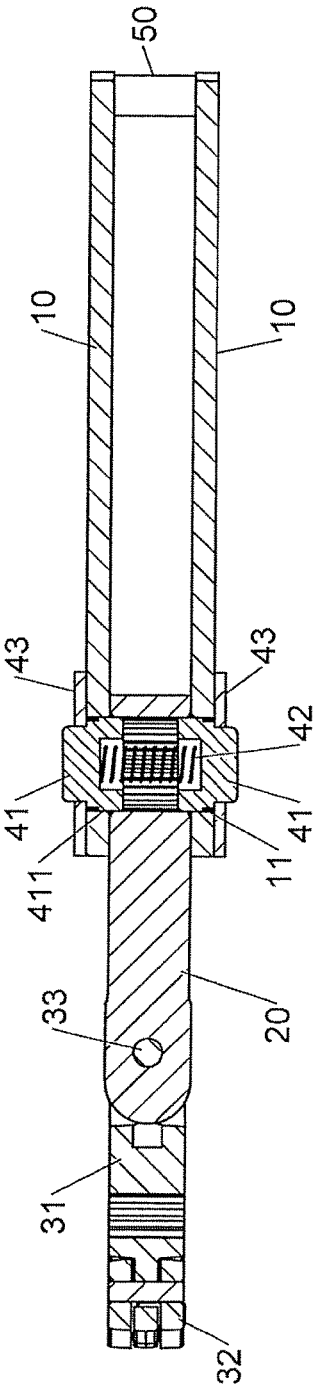
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FIG.5

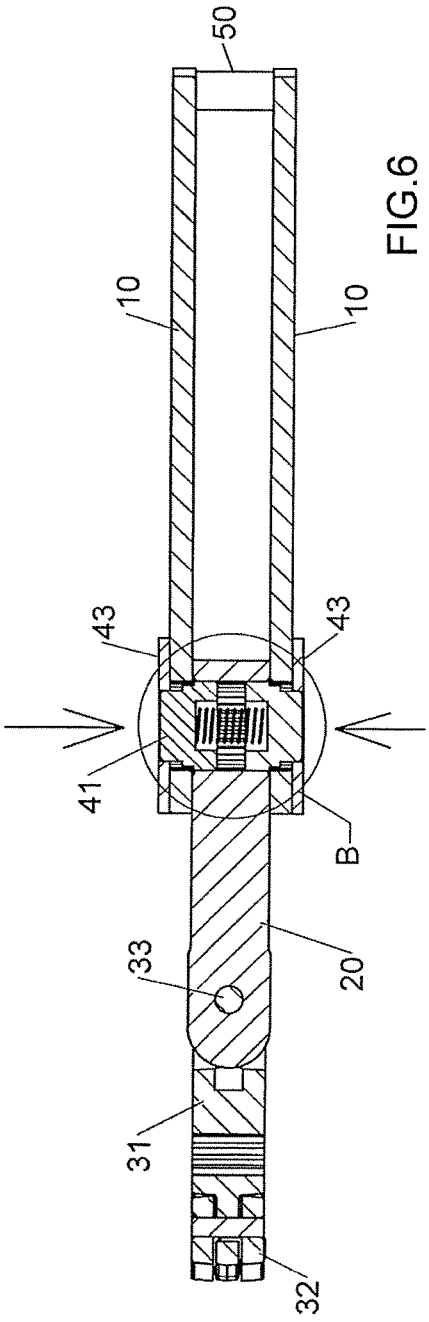

FIG.6

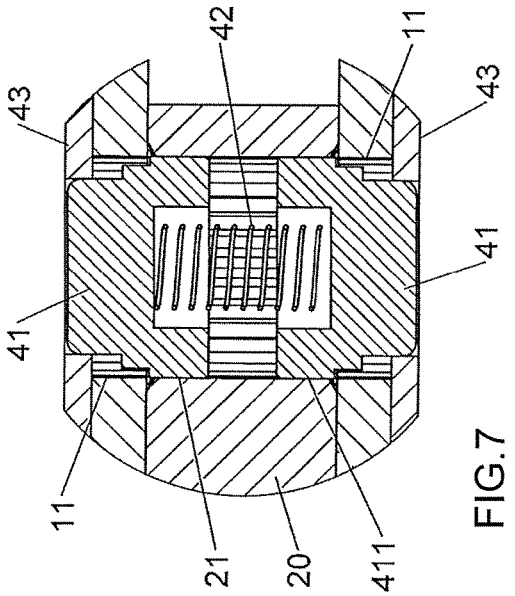

FIG.7

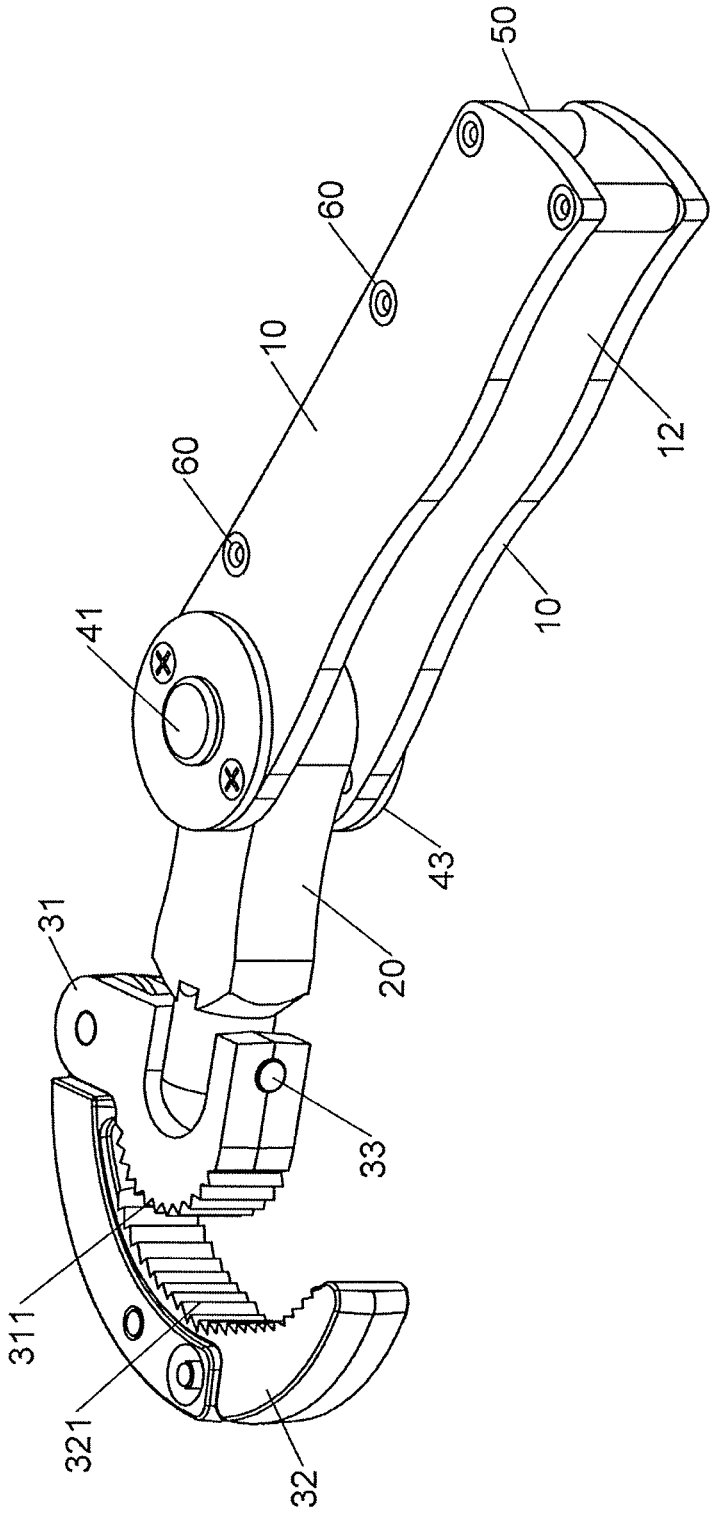

FIG.8

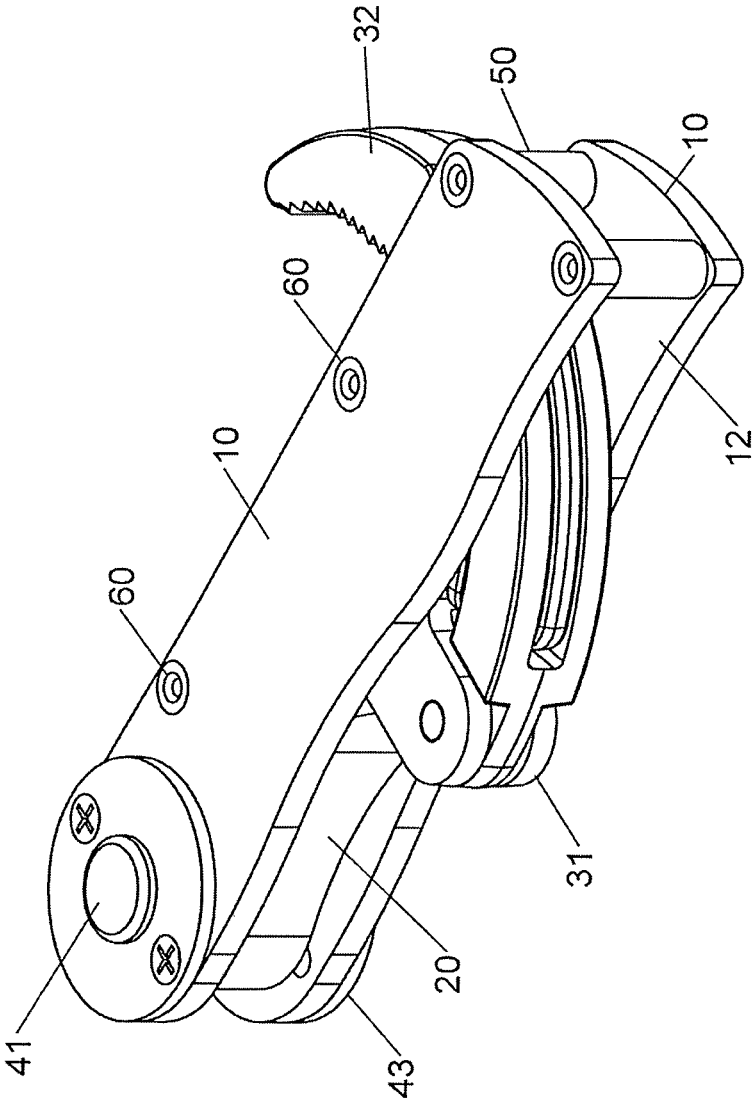

FIG.9

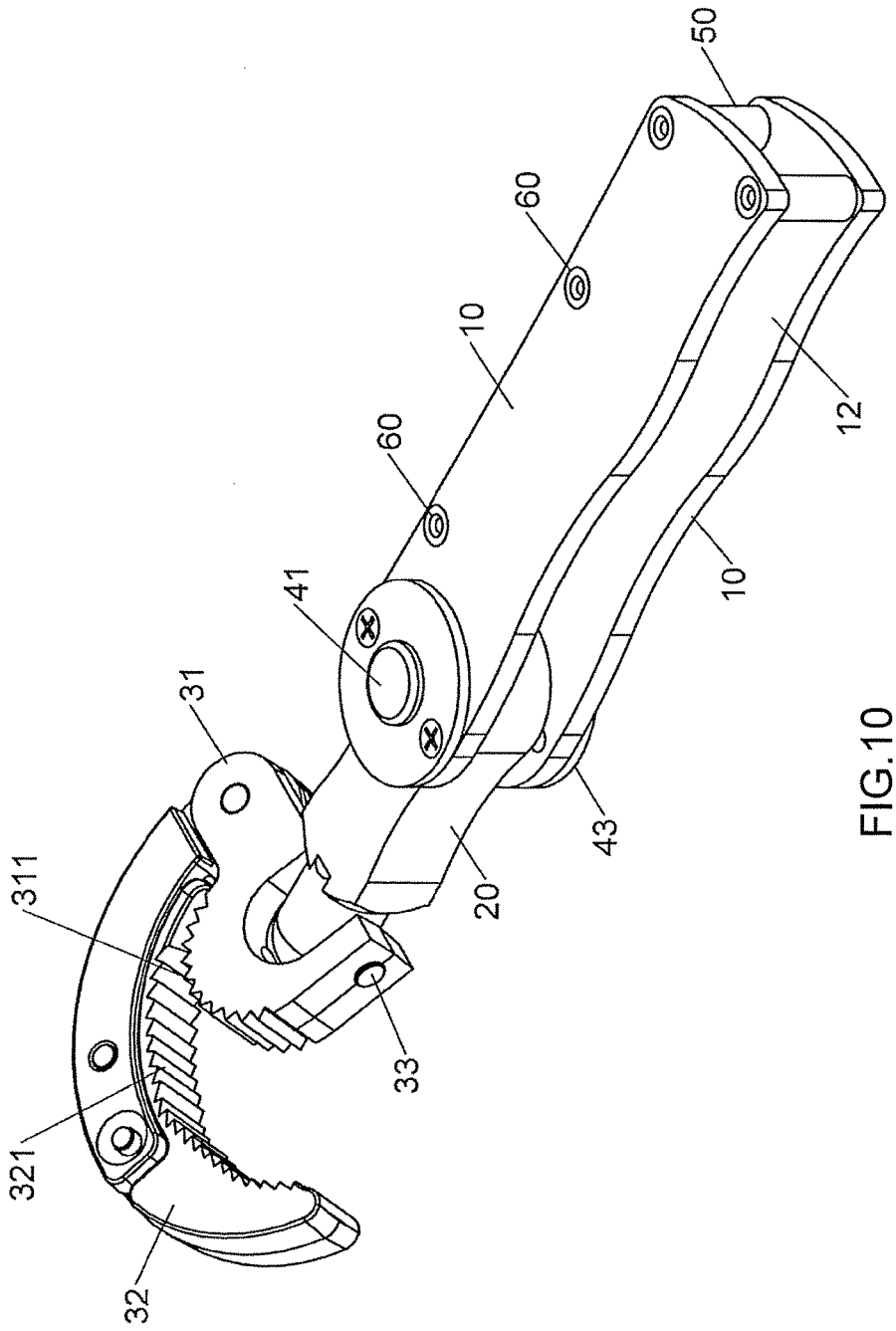

FIG.10

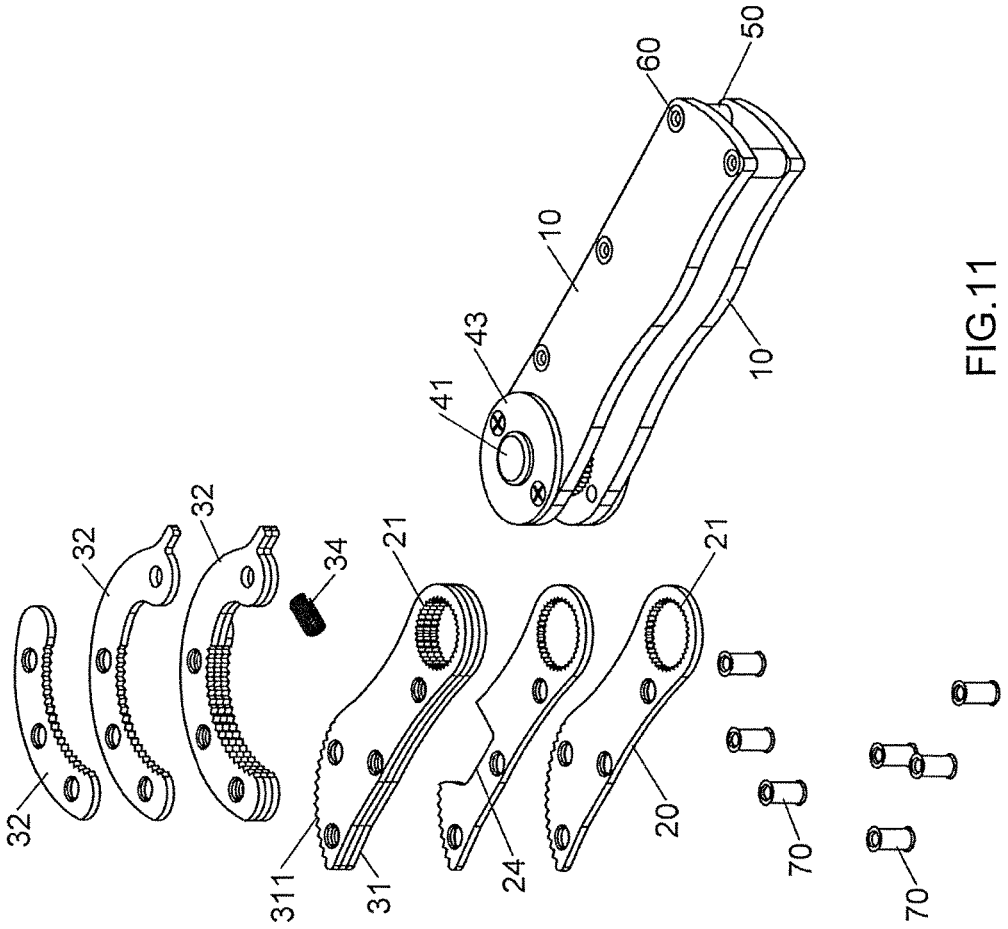

FIG.11

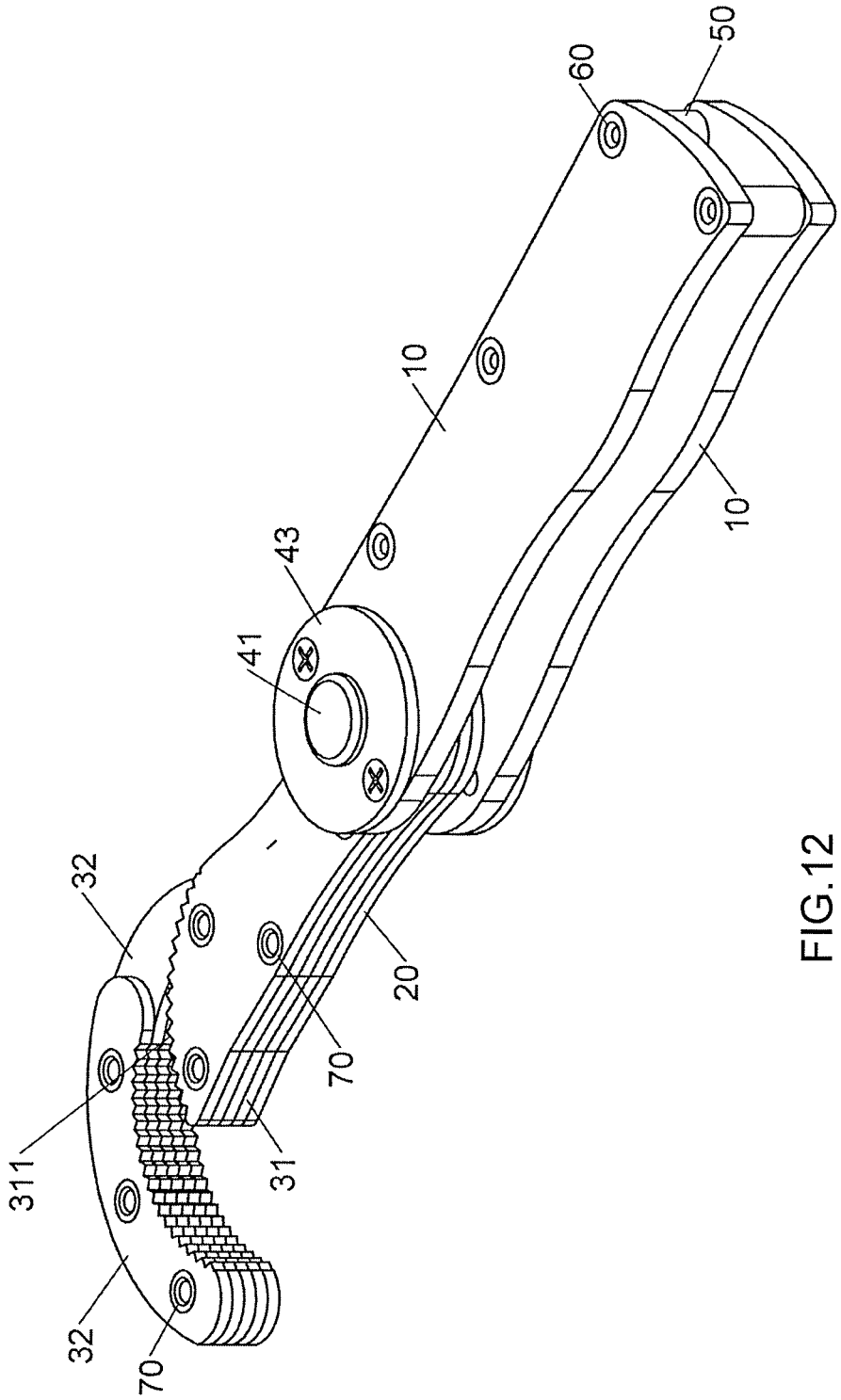

FIG.12

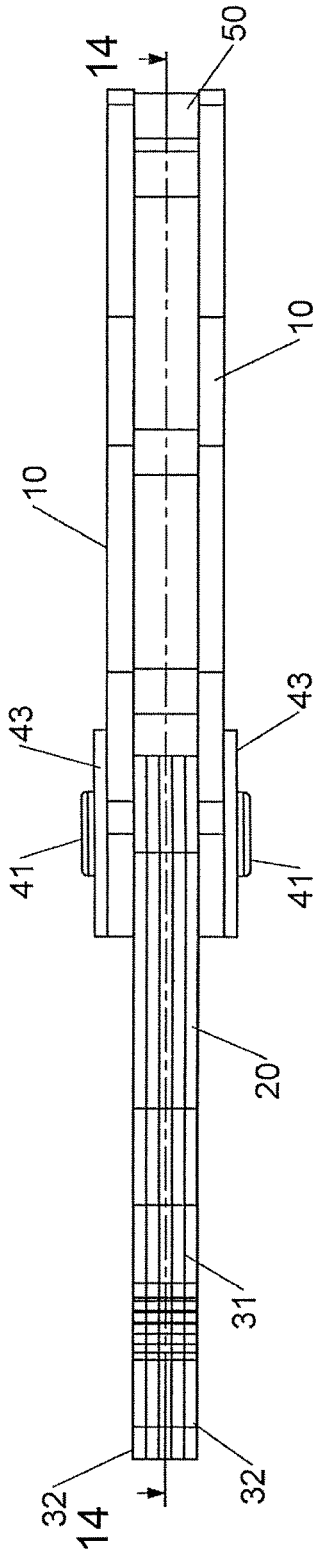

FIG.13

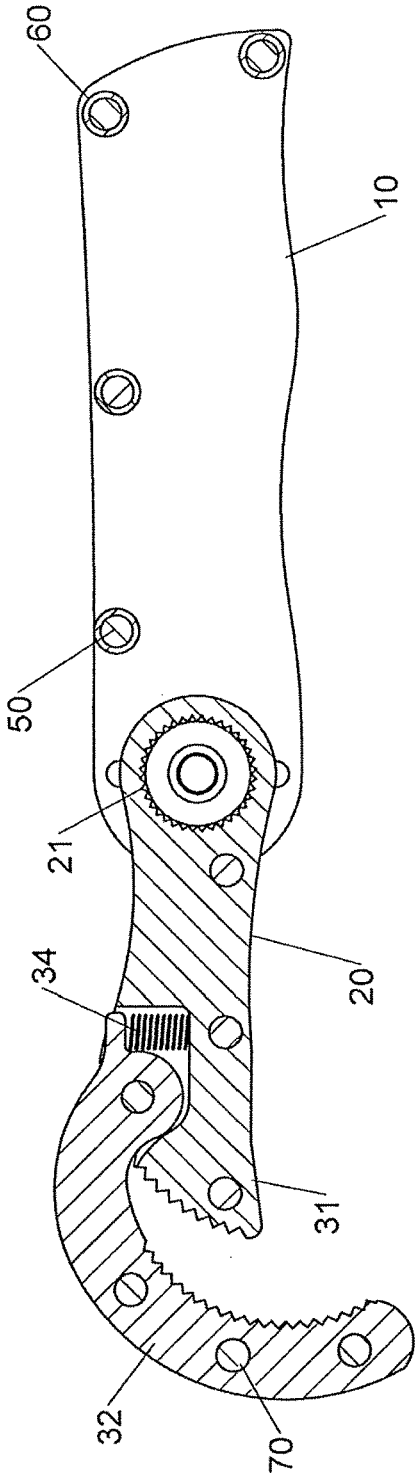

FIG.14

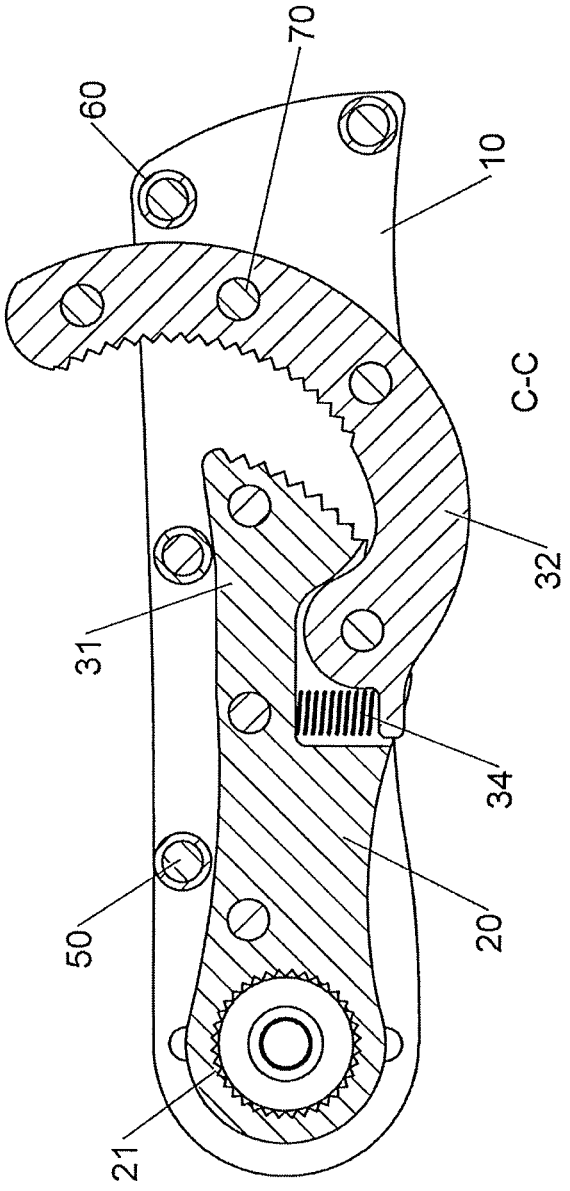

FIG.15

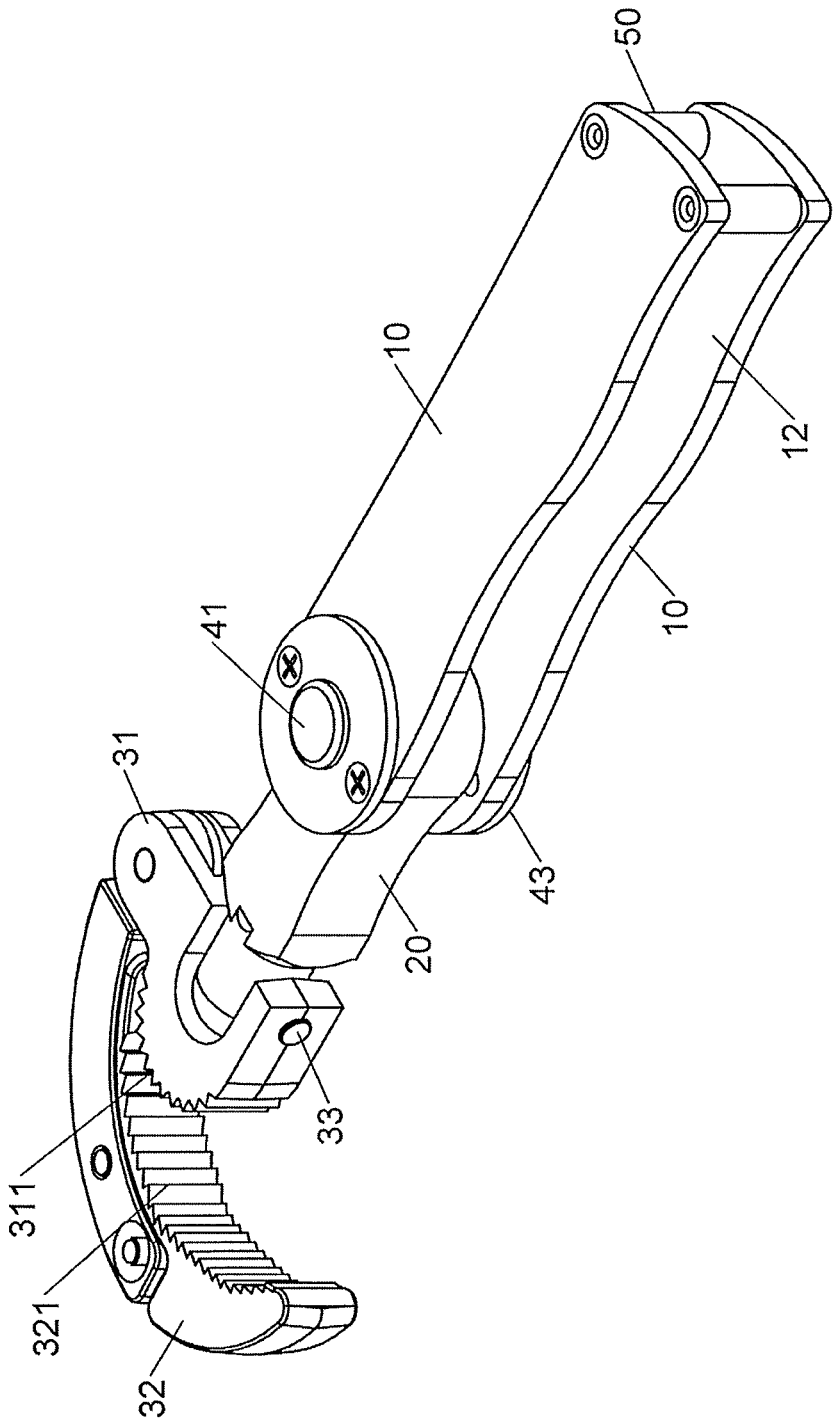

FIG.16

JAW WRENCH

BACKGROUND OF THE INVENTION

1. Fields of the Invention

The present invention relates to a jaw wrench, and more particularly, to a jaw wrench that is able to open wide to clamp larger objects.

2. Descriptions of Related Art

The conventional jaw wrench known to applicant is disclosed in U.S. Pat. No. 2,825,254, and generally comprises a basic structure, a movable jaw member and a lever rod. The basic structure includes a neck and multiple sockets. The movable jaw member has the neck and is able to move linearly relative to the neck by the adjusting member so as to adjust the relative position between the first jaw and the second jaw. The lever rod is connected to one of the sockets so that when the user holds the lever rod, the jaw wrench is adjust a better position to rotate an object. However, there are only three sockets for the basic structure, and the diameter of each of the sockets and the size of the basic structure are limited, so that the relative angular position between the lever rod and the basic structure is restricted by the limited number of the sockets.

The present invention intends to provide a jaw wrench which improves the shortcomings of limited relative position between the basic structure and the lever rod mentioned above.

SUMMARY OF THE INVENTION

The present invention relates to a jaw wrench and comprises two first bodies, a second body a function end unit and a control unit. The first bodies each have a first toothed hole, and a first room is defined between the two first bodies. The second body has a second toothed hole. The function unit includes a third body and a fourth body pivotably connected to the third body. The third body has a first toothed portion and is connected to the second body. The fourth body has a second toothed portion. An object is clamped between the first and second toothed portions. The control unit has two control members, two second resilient members and two covers. The two control members extend into the two first and second bodies and each have a third toothed hole which is engaged with the first/second toothed hole. When the control members are pushed, the third toothed holes are disengaged from the first toothed hole. The covers are connected to the two first bodies so as to restrict the control members and the second resilient members.

The present invention will become more obvious from the following description when taken in connection with the accompanying drawings which show, for purposes of illustration only, a preferred embodiment in accordance with the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is an exploded view of the jaw wrench of the present invention;

FIG. **2** shows a portion of the jaw wrench of the present invention;

FIG. **3** is a perspective view to show the jaw wrench of the present invention;

FIG. **4** is a top view of the jaw wrench of the present invention;

FIG. **5** is a cross sectional view, taken along line **5-5** of FIG. **4**;

FIG. **6** shows that the control members are pushed inward;

FIG. **7** is an enlarged cross sectional view of the circled portion "B" in FIG. **6**;

FIG. **8** shows that the second body is pivoted an angle relative to the first bodies;

FIG. **9** shows that the jaw wrench of the present invention is folded;

FIG. **10** shows that the second body and the function unit are pivoted relative to each other;

FIG. **11** is an exploded view of the second embodiment of the jaw wrench of the present invention;

FIG. **12** is a perspective view to show the second embodiment of the jaw wrench of the present invention;

FIG. **13** shows a side view of the second embodiment of the jaw wrench of the present invention;

FIG. **14** is a cross sectional view, taken along line **14-14** of FIG. **13**;

FIG. **15** is a partial cross sectional view of the folded second embodiment of the jaw wrench of the present invention, and

FIG. **16** is a perspective view to show the third embodiment of the jaw wrench of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIGS. **1** to **3**, the jaw wrench comprises two first bodies **10**, a second body **20**, a function end unit **30**, a control unit **40** multiple tubes **50** and multiple first fixing members **60**. Each first body **10** has four fixing holes **14** and the four fixing holes **14** are located along edges of the first body **10** corresponding thereto. A first toothed hole **11** is defined in the first end of each of the first bodies **10**. A first room **12** is defined between the two first bodies **10**. Two threaded holes **13** are located close to the first toothed hole **11**. The second body **20** has a second toothed hole **21** defined in the first end thereof, and the second toothed hole **21** is located between the two first toothed holes **11** of the two first bodies **10**. A first pivotal portion **22** is defined in the second end of the second body **20**. The number of each of the first toothed holes **11** is the same as that of the second toothed hole **21**. The first pivotal portion **22** has a first pivotal hole **23**. The two first bodies **10** are symmetric relative to the second body **20**.

The function end unit **30** is pivotably connected to the second body **20**, and has a U-shaped third body **31**, a curved fourth body **32** and a cylindrical pin **33**. The third body **31** has a second pivotal hole **313**, a second pivotal portion **312** and a first toothed portion **311** which is defined along a curved face. The second pivotal portion **312** is pivotably connected to the first pivotal portion **22**. the second pivotal portion **312** is located on an opposite side of the first toothed portion **311**. The second pivotal hole **313** is pivotably connected to the first pivotal hole **23**. The third body **31** is pivotable an angle relative to the second body **20** about the second pivotal hole **313**. The second pivotal hole **313** communicates with the second pivotal portion **312**. The fourth body **32** has a first end thereof pivotably connected to the first end of the third body **31**. The fourth body **32** has a second toothed portion **321** defined in a curved face. The second toothed portion **321** faces the first toothed portion **311**. The first toothed portion **311** and the second toothed portion **321** clamp an object therebetween. The pin **33** extends through the first pivotal hole **23** and the second pivotal hole **313** to pivotably connect the second body **20** to the function end unit **30**.

The control unit **40** has two control members **41**, a second resilient member **42**, two covers **43** and fourth screws **44**. The two control members **41** are respectively received in the first and second bodies **10**, **20**. The two control members **41** are located symmetric relative to the second body **20**. Each control member **41** has a third toothed hole **411** defined in the outside thereof. Each of the third toothed holes **411** is engaged with the first and second toothed holes **11**, **21**. Each control member **41** has a recess **412**, and the second resilient members **42** are received in the two respective recesses **412**. The second resilient member **42** biases the third toothed hole **411** of the control member **41** corresponding thereto to be engaged with the first toothed hole **11**/the second toothed hole **21**. When the two control members **41** are pushed to move linearly, the second resilient members **42** are compressed, and each of the third toothed holes **411** is disengaged from the first toothed hole **11** corresponding thereto, and the second toothed hole **21** is still engaged with the third toothed holes **411**. The covers **43** are connected to the two first bodies **10** and restrict the control members **41** and the second resilient member **42**. Each cover **43** has a first circular hole **431** and two second circular holes **432**. The two control members **41** respectively and partially extend through the two first circular holes **431** so that the user can easily push the control members **41**. Each second circular hole **432** is located corresponding to one of the threaded holes **13**. The two covers **43** are respectively located on two respective outsides of the two first bodies **10** and symmetric to the second body **20**. The screws **44** extend through the second circular holes **432** and are threadedly connected to the threaded holes **13** to fix the covers **43** to the first bodies **10**.

The tubes **50** are connected between the two first bodies **10** so as to define the first room **12** between the two first bodies **10**. Each tube **50** is located corresponding to the fixing hole **14** corresponding thereto. The number of the tubes **50** is the same as that of the fixing holes **14**.

The fixing members **60** extend through the fixing holes **14** of the first bodies **10** and the tube **50** to connect the two bodies **10** to each other. The second fixing members **70** are rivets or threading members. The number of the first fixing members **60** is the same as that of the fixing holes **14**.

As shown in FIGS. **4** and **5**, the second body **20** is located between the two first bodies **10**, and the function end unit **30** is connected to the first pivotal hole **23** and the second pivotal hole **313**. The third body **31** and the fourth body **32** are connected to each other. The pin **33** extends through the first and second pivotal holes **23**, **313** to pivotably connect the function end unit **30** to the second body **20**. The third toothed holes **411** are engaged with the first toothed holes **11** and the second toothed hole **21**. Each of the second resilient members **42** is received in the recess **412** of the control member **41** corresponding thereto. The four screws **44** connect the two covers **43** to the first bodies **10** to restrict the two control members **41** and the two second resilient members **42** from dropping from the first bodies **10**. The four tubes **50** are located between the two first bodies **10** and located corresponding to the fixing holes **14**. The four first fixing members **60** are connected to fixing holes **14** of the two first bodies **10** to connect the two first bodies **10**.

As shown in FIGS. **6** to **8**, the two control members **41** are pushed linearly and simultaneously to compress the second resilient members **42**, and the third toothed holes **411** are disengaged from the first toothed holes **11** and are still engaged with the second toothed hole **21**. The second body **20** can be pivoted to adjust the relative position between the first and second bodies **10**, **20**. After the relative position between the first and second bodies **10**, **20** is adjusted, as shown in FIG. **8**, the two control members **41** are released, the second resilient members **42** push the two control members **41** backward, and the relative position between the first and second bodies **10**, **20** is set.

As shown in FIG. **9**, when the two control members **41** are pushed linearly and simultaneously, the function end unit **30** and the second body **20** are pivoted to be received in the first room **12** such that the jaw wrench is in its folded status which saves room for storage.

As shown in FIG. **10**, the second body **20** is pivotably connected to the function end unit **30**, and the first pivotal portion **22** is pivotably connected to the second pivotal portion **312**, The pin **33** extends through the first pivotal hole **23** and the second pivotal hole **313**, so that the function end unit **30** can be pivoted an angle about the pin **33** relative to the second body **20**. The function end unit **30** can be adjusted its angular position relative to the second body **20**.

As shown in FIGS. **11** and **12**, this embodiment shows that each of the second and third bodies **20**, **31** are composed multiple plates, and one of the plates that is located at the middle of the second body **20** includes a second room **24** which is a recess. Each of the second body **20** and the third body **31** has multiple first installation units, wherein the plate that has the second room **24** that is a recess has three first installation units. The rest of the plates of the first and third bodies **20**, **31** each have four first installation units. Each first installation unit is a hole and located corresponding to each other. The fourth body **32** is composed of multiple plates and pivotably connected to the second body **20** and the third body **31**. The fourth body **32** has third pivotal holes. The third pivotal holes are located corresponding to one of the first installation units. Each plate of the fourth body **32** has three second installation units which are holes, the second installation units of the plates of the fourth body **32** are located corresponding to each other. A first resilient member **34** is received in the second room **24** and biased between the second body **20** and the fourth body **32**. Four second fixing members **70** extend through the first installation units of the second body **20** and the third body **31** to connect the second body **20** to the third body **31**. Three second fixing members **70** are connected to the second installation units of each plate of the fourth body **32** to connect the plates to form the fourth body **32**. The second fixing members **70** are rivets or threading members.

When assembling, as shown in FIGS. **13** and **14**, the second toothed holes **21** of the third body **31** and the second body **20** are located corresponding to each other, and both of which are inserted between the two first bodies **10** and located corresponding to the first toothed holes **11**. The fourth body **32** is pivotably connected to the second and third bodies **20**, **31**. The first resilient members **34** are respectively received in the second rooms **24**. The first resilient member **34** is biased between the second and fourth bodies **20**, **32**. The four second fixing members **70** are connected to the plates of the second body **20** and the first installation units of the third body **31**. The other three second fixing members **70** are connected to the second installation units of the plates of the fourth body **32** to form the combination as shown in FIG. **12**.

As shown in FIG. **15**, when the two control members **41** are pushed linearly and simultaneously, the third toothed holes **411** of the two control members **41** are engaged with the second toothed holes **21** of the second and third bodies **20**, **31**, so that the second body **20** can be pivoted to adjust the relative position between the first bodies **10**, the second

body **20** and the third body **31**. The second body **20**, the third body **31** and the fourth body **32** can be received in the first room **12**.

As shown in FIG. **16**, this embodiment does not have the tubes **50** and the first fixing members **60**, while the second body **20** and the function end unit **30** can be pivoted 360 degrees about the first toothed holes **11** of the first bodies **10**.

The advantages of the present invention are that when the two control members **41** are pushed to move linearly, the second resilient members **42** are compressed, and each of the third toothed holes **411** is disengaged from the first toothed hole **11** corresponding thereto, and the second toothed hole **21** is still engaged with the third toothed holes **411**. Therefore, the second body **20** can be pivoted to adjust the relative position between the first bodies **10** and the second body **20**.

The two control members **41** have to be pushed simultaneously to perform the desired function, in other words, there are double safety features so that vibration of shaking of the jaw wrench cannot cause both of the control members **41** to be pushed.

The two control members **41** are biased by the second resilient members **42**, when the two control members **41** are released, the second resilient members **42** push the control members **41** back to their initial positions.

Each of the first, second and third toothed holes **11**, **21**, **411** includes teeth arranged along a circular inner periphery thereof so that there are multiple positioned between the first bodies **10** and the second body **20** can be set. Assume that each of the first, second and third toothed holes **11**, **21**, **411** includes 36 teeth, there will be at least 24 positions between the first bodies **10** and the second body **20** can be set.

As shown in FIG. **9**, the second body **20** and the function end unit **30** can be pivoted and received in the first room **12** between the first bodies **10** to save storage space needed.

The second body **20** is pivotably connected to the function end unit **30**. The first pivotal portion **22** is pivotably connected to the second pivotal portion **312**. The first pivotal hole **23** is pivotably connected to the second pivotal hole **313**. The pin **33** extends through the first and second pivotal holes **23**, **313**, such that the function end unit **30** can be pivoted about the pin **33** relative to the second body **20** to set the relative position between the function end unit **30** and the second body **20**.

While we have shown and described the embodiment in accordance with the present invention, it should be clear to those skilled in the art that further embodiments may be made without departing from the scope of the present invention.

What is claimed is:

1. A jaw wrench comprising:

two first bodies and each first body having multiple fixing holes, a first toothed hole defined in a first end of each of the first bodies, a first room defined between the two first bodies, two threaded holes located close to the first toothed hole;

a second body having a second toothed hole defined in a first end thereof, a first pivotal portion defined in a second end of the second body, the second toothed hole located between the two first bodies and located corresponding to the two respective first toothed holes, a number of each of the first toothed holes being the same as that of the second toothed hole, the first pivotal portion having a first pivotal hole, the two first bodies being symmetric relative to the second body;

a function end unit having a third body, a fourth body and a pin, the third body connected to the second body, the third body having a second pivotal hole, a second pivotal portion and a first toothed portion which is defined along a curved face, the second pivotal portion being pivotably connected to the first pivotal portion, the second pivotal hole being pivotably connected to the first pivotal hole, the third body being pivotable an angle relative to the second body about the second pivotal hole, the second pivotal hole communicating with the second pivotal portion, the fourth body having a first end thereof pivotably connected to a first end of the third body, the fourth body having a second toothed portion defined in a curved face, the second toothed portion facing the first toothed portion, the first toothed portion and the second toothed portion adapted to clamp an object therebetween, the pin extending through the first pivotal hole and the second pivotal hole to pivotably connect the second body to the function unit;

a control unit having two control members, a second resilient member, two covers and fourth screws, the two control members respectively received in the first and second bodies, the two control members located symmetric relative to the second body, each control member having a third toothed hole defined in an outside thereof, the third toothed holes engaged with the first and second toothed holes, each control member having a recess, the second resilient members received in the two respective recesses, the second resilient member biasing the third toothed hole of the control member corresponding thereto to be engaged with the first toothed hole/the second toothed hole, when the two control members are pushed to move linearly, the second resilient members are compressed, and each of the third toothed holes is disengaged from the first toothed hole corresponding thereto, and the second toothed hole is still engaged with the third toothed hole, the covers connected to the two first bodies and restricting the control members and the second resilient member, each cover having a first circular hole and two second circular holes, the two control members respectively and partially extending through the two first circular holes, each second circular hole located corresponding to one of the threaded holes, the two covers respectively located on two respective outsides of the two first bodies and symmetric to the second body, the screws extending through the second circular holes and threadedly connected to the threaded holes to fix the covers to the first bodies;

multiple tubes connected between the two first bodies so as to defined a first room between the two first bodies, each tube located corresponding to the fixing hole corresponding thereto, and

multiple fixing members extending through the fixing holes of the first bodies and the tube to connect the two bodies to each other.

2. The jaw wrench as claimed in claim **1**, wherein there are four fixing holes which are located along edges of the first body corresponding thereto.

3. The jaw wrench as claimed in claim **1**, wherein the second body and the function unit are pivoted to be received in the first room when the control members are pushed to disengage the third toothed hole from the second toothed hole.

4. The jaw wrench as claimed in claim **1**, wherein each of the second and third bodies is composed multiple plates.

5. The jaw wrench as claimed in claim **4**, wherein one of the plates that is located at a middle of the second body includes a second room which is a recess, a first resilient

member is received in the second room and biased between the second body and the fourth body.

6. The jaw wrench as claimed in claim **1**, wherein the fourth body is composed of multiple plates and pivotably connected to the second and third bodies.

7. The jaw wrench as claimed in claim **6**, wherein each of the second body and the third body has multiple first installation units, the first installation units are holes and located corresponding to each other, the fourth body has third pivotal holes which are located corresponding to one of the first installation units, each plate of the fourth body has three second installation units which are holes, the second installation units of the plates of the fourth body are located corresponding to each other, multiple second fixing members extend through the first installation units of the second body and the third body to connect the second body to the third body, multiple second fixing members are connected to the second installation units of each plate of the fourth body to connect the plates to form the fourth body, the second fixing members are rivets or threading members.

8. The jaw wrench as claimed in claim **1**, wherein the second body and the function end unit are pivotable 360 degrees about the first toothed holes of the first bodies.

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