B. H. PARKER.

TOOL.

APPLICATION FILED MAY 19, 1919.

1,353,847. Patented Sept. 28, 1920.

Fig. 1.

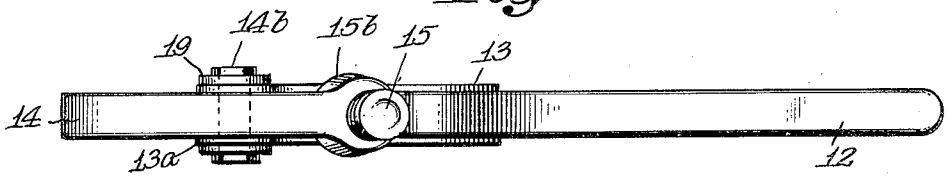


Fig. 2.

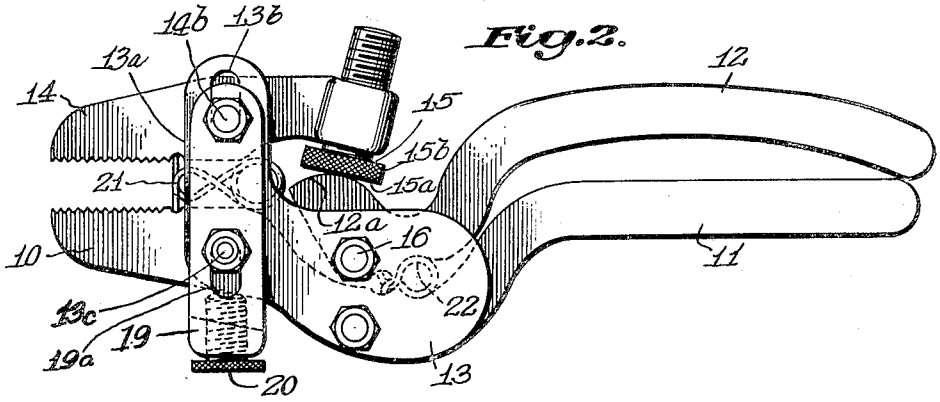


Fig. 4.

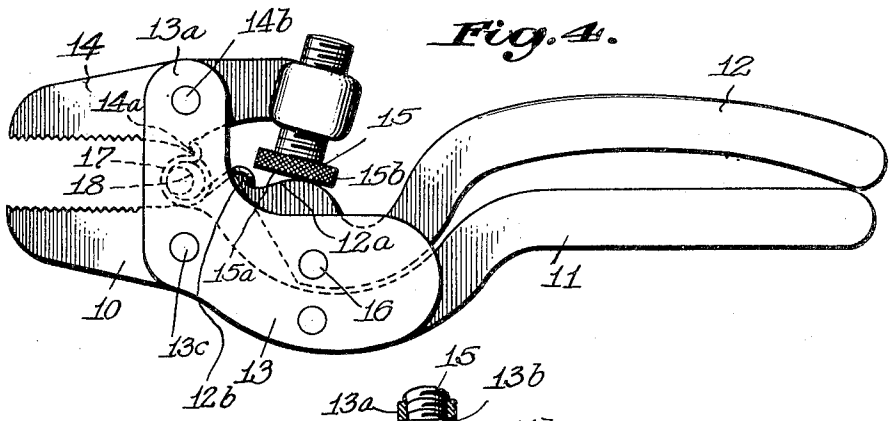
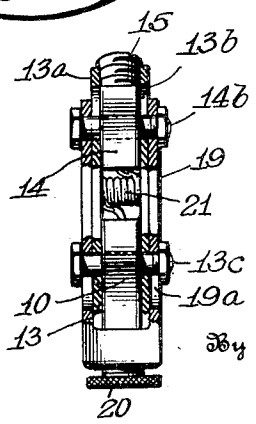


Fig. 3.



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UNITED STATES PATENT OFFICE.

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TOOL.

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To all whom it may concern:

Be it known that I, BURTON H. PARKER, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Tools, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to improvements in tools, pertaining more particularly to structures wherein two jaw members are adapted to engage the work, as wrenches, pliers, pipe tongs, etc.

For many uses, tools of this general character require a strong grip of the jaws upon the work in order that slippage may not take place. This result is obtainable, of course, by providing the handle with a relatively long leverage, but this provides a disadvantage in the fact that the length of the movement at the ends of the handle arms increases proportionately to the length of the arms from the pivot point, the general result being that in operating such tools the operator is required to utilize both hands in order to obtain the proper pressure at the jaws. While attempts have been made to meet this condition by articulated levers etc., the results have not been satisfactory in many cases.

The present invention is designed to provide a powerful tool of this general class and at the same time produce the result with a comparatively short leverage and thus produce a handle grip structure capable of ready manipulation by one hand and at the same time permit this powerful engaging action to be maintained upon the work without requiring heavy pressure application for continued periods on the handle members.

A further object is to provide a tool of this class which is simple and efficient in operation, durable in construction and which can be manufactured at a relatively low cost.

To these and other ends, therefore, the nature of which will be readily understood as the invention is hereinafter disclosed, said invention consists in the improved construction and combination of parts, hereinafter more fully described, illustrated in the accompanying drawings, and more particularly pointed out in the appended claims.

In the accompanying drawings, in which similar reference characters indicate similar parts in each of the views,—

Figure 1 is a top plan view of a preferred form of my invention;

Fig. 2 is a side elevation of the same;

Fig. 3 is a transverse sectional view of parts shown in Fig. 2, parts being shown in elevation;

Fig. 4 is a side elevation of a modified form.

The simpler form of the invention is illustrated in Fig. 4, in which 10 indicates the fixed jaw formed at the advance end of the gripping member 11, the latter forming one of the parts of the gripping handle. While not absolutely essential, it is preferred to join the jaw 10 and member 11 by a curved portion, the configuration of which provides a recess into which the other gripping member 12 of the handle extends, the latter being mounted in two plates 13 secured on opposite sides of the jaw member, as shown, for instance in Fig. 3, the mounting being in suitable manner such as provides for pivotal action of member 12. Plates 13 are extended laterally, as at 13^a, these extensions providing for the support of the movable or pivoted jaw 14, the latter being mounted for pivotal movement between the extensions 13^a.

Jaw 14 is mounted in such manner as to provide lever action of the first order, the rear portion of the jaw being formed to provide a mounting for a member 15 carrying a face 15^a which is adapted to coöperate with member 12 in setting the tool on to the work. For purposes of illustration, the member 15 is shown as in the form of a threaded element having a head 15^b, face 15^a forming the outer face of head 15^b. Since member 15 is threaded, it may be shifted, in the direction of its length by the usual threading action of the jaw, thus advancing or retracting the face as may be found desirable in use.

The member 15 forms one of the elements of a complemental means for setting the tool on to the work or for rocking the jaw 14 on its pivot. The other element of said means is in the form of a cam face 12^a formed on said member 12, the configuration of the member being such as to provide the contacting relation of the two faces 12^a and 15^a to be in advance of the pivot point 16 of member 12, the arrangement being such that when the jaws are engaged with

the work, the point of contact of the two faces will approach a position corresponding somewhat to the straight line position of a toggle, it being understood, however, that there is no connection between the member 15 or the cam portion of the member 12. In other words, the relative movement of the point of contact of the two faces during the closing movements of handle 12 and jaw 14 is such that the shift in position of the point of contact has characteristics of the shift of the pivot of a toggle approaching the toggle straight line position. By this arrangement, it will be readily understood that the rate of advance of the jaw 14 to the work decreases with the shift in the point of contact and becomes somewhat slow, so that movement of handle 12 can be provided without excessive pressure and at the same time provide for the application of pressure of a comparatively large value on to the face 15^a, thus enabling a powerful engaging action to be provided between the jaws and the work to be gripped or clamped, the small variations between what may be considered as the arc of contact of face 12^a and the arc of a circle having pivot 16 for its center, is so small as to permit this result to be obtained without the liability of counter pressure being placed on the handle portion 12 of any material value, the counter pressure being placed more particularly upon pivot 16. This not only provides for the setting action without the use of excessive pressure on the handle or gripping portion, but in addition provides an arrangement which tends to maintain the set condition of the jaws without requiring excessive pressure to maintain such condition, due to the fact that the variation referred to is not sufficient to rock the member 12 on its pivot in the presence of the setting counter pressure.

As heretofore pointed out, there is no direct connection between head 15^b and member 12, and to normally maintain the two faces in contact whether members 12 and 11 are in the position shown in Fig. 4 or in an open position, I utilize a tension means in the form of a spring 17, this spring being mounted on a pin connection 18 and having one end engaging a toe 14^a of jaw 14 while the other end of the spring engages a toe 12^b of member 12, the arrangement being such that as the position of member 12 is changed to open the jaws the spring 17 will exert the pressure on toe 14^a to rock jaw 14 on its pivot, thus causing face 15^a to follow face 12^a as the latter recedes from the position shown in Fig. 4, the small variation referred to heretofore permitting the members 11 and 12 to move to open position in a simple and efficient manner.

As will be understood, the arrangement just described, provides a structure in which the pivot of jaw 14 is permanently fixed, so that variations in distance between the jaws is more or less limited to the adjustment of member 15. For universal usage, however, it may be desirable to provide for variation in such distance in ways not permitted by the simple adjustment of the member 15, and to permit this result to be obtained, the particular structure of Fig. 4 may be varied to some extent and thus make it possible to vary the position of the pivot of jaw 14. An arrangement of this kind is shown in Fig. 2 in which the changes are substantially as follows:

In the form shown in Fig. 2, extensions 13^a are slotted as at 13^b, one of the rivets or pins 13^c—which passes through the jaw 10—being changed to bolt structure, pivot 14^b of Fig. 4 also being changed to a bolt formation. With these changes I add a strap 19 of U-shape configuration in end view, the legs of the strap overlying extensions 13^a and being adapted to engage the bolts which are indicated as 14^b and 13^c in Fig. 4, the openings for bolt 14^b being a simple circular opening while that for bolt 13^c is in the form of a slot 19^a. The bridge of member 19 carries an adjusting screw 20 which is adapted to engage the outer face of jaw 10.

By this arrangement, the position of pivot 14^b can be adjustably changed. For instance, if set screw 20 be moved to increase the distance between its inner end and the face of jaw 10, and with bolts 14^b and 13^c loose to prevent clamping of extensions 13^a, the jaws and member 19, movement of bolt 14^b can be had in a direction to increase the distance between it and the bolt 13^c, member or yoke 19 moving upwardly in Fig. 2 carrying the bolt 14^b therewith while slots 19^a permit this movement of member 19 to be had without affecting the position of bolt 13^c, thus again bringing member 20 into contact with jaw 10.

While this adjusted position of bolt 14^b may be maintained in any suitable manner, I prefer to provide this result by the use of a spring or other tension means 21, this spring resting between jaws 10 and 14 and having portions engaging both jaws, this spring normally tending to separate the jaws, the result being that the inner end of the member 20 will be yieldingly held in contact with the face of the fixed jaw. This spring 21 is designed to perform a part of the work done by spring 17 in the form shown in Fig. 4. However, it cannot serve all of the purposes for the reason that it is located between the jaws, whereas the spring 17 is located between the jaw 14 and handle 12. To provide for normally maintaining the handle member 12 in its open position, and under the changed conditions provided in the structure of Fig. 2, I prefer-

ably employ a spring 22 which is located between the two handle members 11 and 12, the structure of Fig. 2 thus employing two springs 21 and 22 in place of the single spring 17 of Fig. 4.

It will be obvious, of course, that when member 19 has been adjusted to the desired position, the tool will operate substantially the same as the tool of Fig. 4, the position of bolt 14^b remaining substantially constant as long as the threaded member 20 is unchanged, especially in the presence of the work between the jaws, the changed structure being designed mainly to permit of adjustability in position of pivot of 14^b.

And since two springs are employed instead of one, it will be understood that toe 14^a and toe 12^b may be omitted from the structure of Fig. 2.

From the above description it will be readily understood that I have provided a tool of comparatively small size and yet capable of applying the jaws with heavy power, and this result is obtained by a simple formation of few parts each of a character such as to permit of formations of extreme strength, so that the structure itself is one of great power, yet is compact and of such form as to be readily manufactured and assembled at comparatively low costs.

While I have herein shown and described preferred ways in which the invention may be carried into effect, it will be readily understood that changes or modifications therein may be found desirable or necessary, in meeting the exigencies of use, and I desire to be understood as reserving the right to make any and all such changes or modifications therein as may be found necessary or desirable, in so far as the same may fall within the spirit and scope of the invention as expressed in the accompanying claims.

Having thus described my invention, what I claim as new is:—

1. In a tool having opposing jaw members for engaging the work, a jaw element including a handle member, a pivoted handle member, a pivoted jaw independent of the pivoted member, and complemental means carried by the pivoted member and pivoted jaw and operative to produce leverage action of the first order on the pivoted jaw by closing movement of the handle members, said means including a cam face carried by the pivoted handle member, and a headed threaded member carried by the pivoted jaw with the head opposing and of greater width than the width of the cam face, said head having a face adapted to coöperate with the cam face, whereby adjustment of the threaded member may be provided by the fingers of the hand gripping the handle members.

2. In a tool having opposing jaw members for engaging the work, a jaw element including a handle member, a pivoted handle member, a pivoted jaw independent of the pivoted member, and complemental means carried by the pivoted member and pivoted jaw and operative to produce leverage action of the first order on the pivoted jaw by closing movement of the handle members, said means including a pair of faces carried by the pivoted handle member and the pivoted jaw respectively, said faces being located relatively to the pivot points of the elements carrying the faces as to cause relative movement of the faces to shift the point of contact of the faces during opening and closing movements of the pivoted jaw, such face movement being such that the shift in position of the point of contact of the faces has characteristics of the shift of the pivot of a toggle approaching the toggle straight line position, such point of contact shift being operative to place a counter pressure value direct upon the pivot of the pivoted handle member while applying the jaws to the work.

3. In a tool having opposing jaw members for engaging the work, a jaw element including a handle member, a pivoted handle member, a pivoted jaw independent of the pivoted member, and complemental means carried by the pivoted member and pivoted jaw and operative to produce leverage action of the first order on the pivoted jaw by closing movement of the handle members, said means including a pair of faces carried by the pivoted handle member and the pivoted jaw respectively, said faces being located relatively to the pivot points of the elements carrying the faces so as to cause relative movements of the faces to shift the point of contact of the faces during opening and closing movements of the pivoted jaw, such face movements being such that the shift in position of the point of contact of the faces has characteristics of the shift of the pivot of a toggle in approaching the toggle straight line position, such point of contact shift being operative to place the counter pressure value direct upon the pivot of the pivoted handle member while applying the jaws to the work, with the cam face formation operative to produce a slow advance of the pivoted jaw to the work during this period.

4. In a tool having opposing jaw members for engaging the work, a jaw element including a handle member, a pivoted handle member, a pivoted jaw independent of the pivoted member, and complemental means carried by the pivoted member and pivoted jaw and operative to produce leverage action of the first order on the pivoted jaw by closing movement of the handle members, said means including a cam face carried by the pivoted handle member, a headed threaded member carried by the pivoted jaw with the

head carrying a face opposing and of greater width than the width of the cam face, and tension means coöperating with the pivoted jaw for normally maintaining said faces in contact.

5. In a tool having opposing jaw members for engaging the work, a jaw element including a handle member, a pivoted handle member, a pivoted jaw independent of the pivoted member, and complemental means carried by the pivoted member and pivoted jaw and operative to produce a leverage action of the first order on the pivoted jaw by closing movement of the handle members, said means including a cam face carried by the pivoted handle member, and a headed threaded member carried by the pivoted jaw with the head having a face opposing and of greater width than the width of said cam face, the adjustment of said threaded member being effective to control the normal distance between the operating faces of the jaws.

6. In a tool having opposing jaw members for engaging the work, a jaw element including a handle member, a pivoted handle member, a pivoted jaw independent of the pivoted member, and complemental means carried by the pivoted member and pivoted jaw and operative to produce a leverage action of the first order on the pivoted jaw by closing movement of the handle members, said means including a cam face carried by the pivoted handle member and a face adjustably carried by the pivoted jaw, said faces being positioned relative to the pivot points of the elements carrying the faces so as to cause relative movements of the faces to shift the point of contact of the faces during opening and closing movements of the pivoted jaw, such face movements being such that the shift in position of the point of contact of the faces has characteristics of the shift of the pivot of a toggle in approaching the toggle straight line position, such point of contact shift being operative to place a counter pressure value direct upon the pivot of the pivoted toggle member while applying the jaws to the work, and tension means coöperating with the pivoted jaw for normally maintaining said faces in contact, said tension means being operative to normally maintain the jaws in an open position.

7. In a tool having opposing jaw members for engaging the work, a fixed jaw element including a handle, said element having fixed extensions rigid therewith, a pivoted handle member, a movable jaw located between such fixed extensions, a pivot member extending through said extensions, and movable jaw and forming the axis of jaw movement in applying the tool, an element adjustably carried by the fixed jaw element and forming a support for the pivot member, said adjustable element and the extensions having slotted configurations adapted to compensate for such adjustment, whereby said axis may be shifted toward and from the fixed jaw element, and complemental means carried by the pivoted handle member and movable jaw operative to produce a leverage action of the first order on the movable jaw by closing movements of the handle members.

8. In a tool having opposing jaw members for engaging the work and wherein one of said jaws is movable on an axis and is free from direct connection with the handle which operates it, a fixed jaw, plate-like extensions between which the movable jaw is positioned, said extensions being fixedly secured to the fixed jaw, a U-shaped element having its legs overlying said extensions, said elements being adjustable in the direction of length of its legs, and a pivot member extending through the movable jaw said extensions and the legs of said element, said extensions and element having openings and slots to compensate for the adjustability of the U-shaped element, said adjustability being operative to shift the position of said axis toward and from the fixed jaw element.

9. In a tool having opposing jaw members for engaging the work and wherein one of said jaws is movable on an axis and is free from direct connection with the handle which operates it, a fixed jaw, plate-like extensions between which the movable jaw is positioned, said extensions being fixedly secured to the fixed jaw, a U-shaped element having its legs overlying said extensions, said elements being adjustable in the direction of length of its legs, and a pivot member extending through the movable jaw said extensions and the legs of said elements, said extensions and elements having openings and slots to compensate for the adjustability of the U-shaped element, said adjustability being operative to shift the position of said axis toward and from the fixed jaw element, the openings and slots of the extensions and legs being relatively arranged to provide registration of a slot of one part with the opening of the other part.

In testimony whereof I affix my signature in the presence of two witnesses.

BURTON H. PARKER.

Witnesses:
LEWIS E. FLANDERS,
ANNA M. DORR.