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CAM-CLOSING, PIVOTED-JAW PLIERS HAVING
DISPLACEABLE-HALF-NUT ACTUATOR

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2 Sheets-Sheet 1

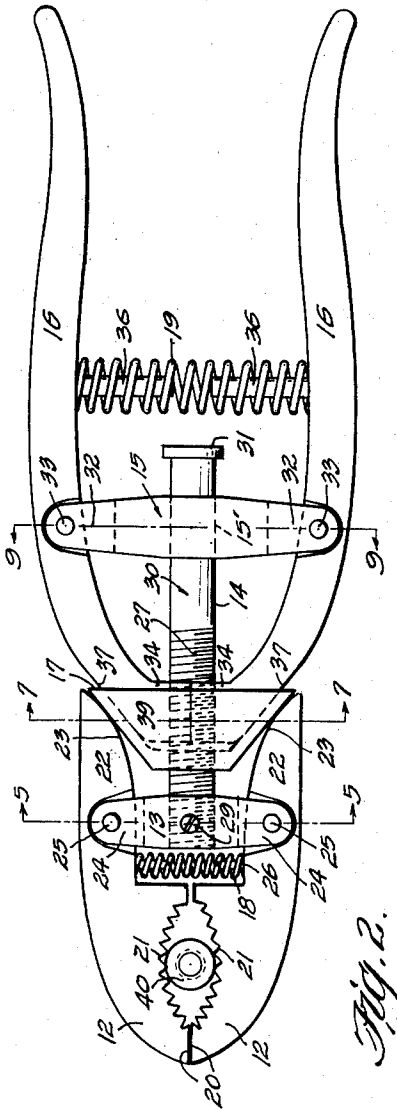


Fig. 1.

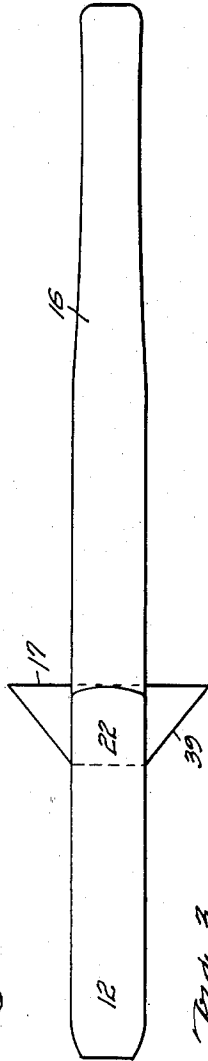


Fig. 2.

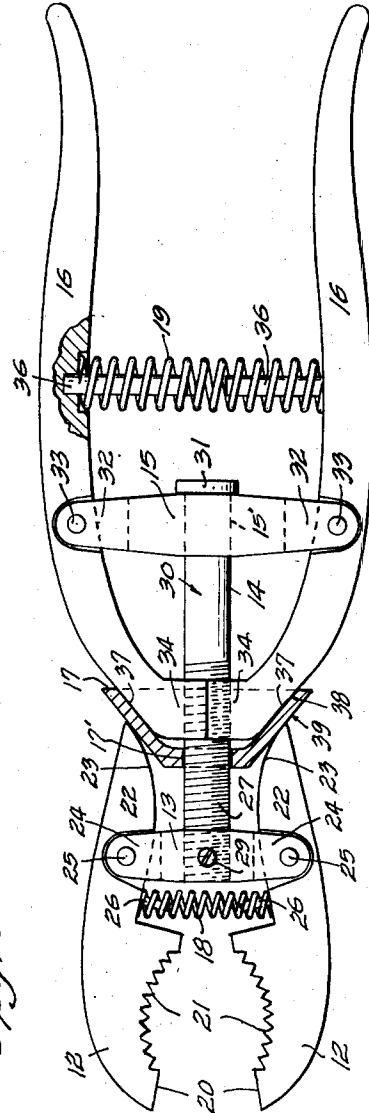


Fig. 3.

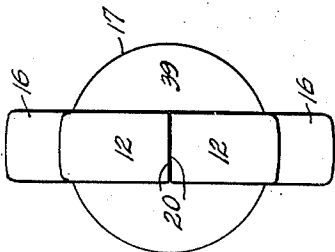


Fig. 4.

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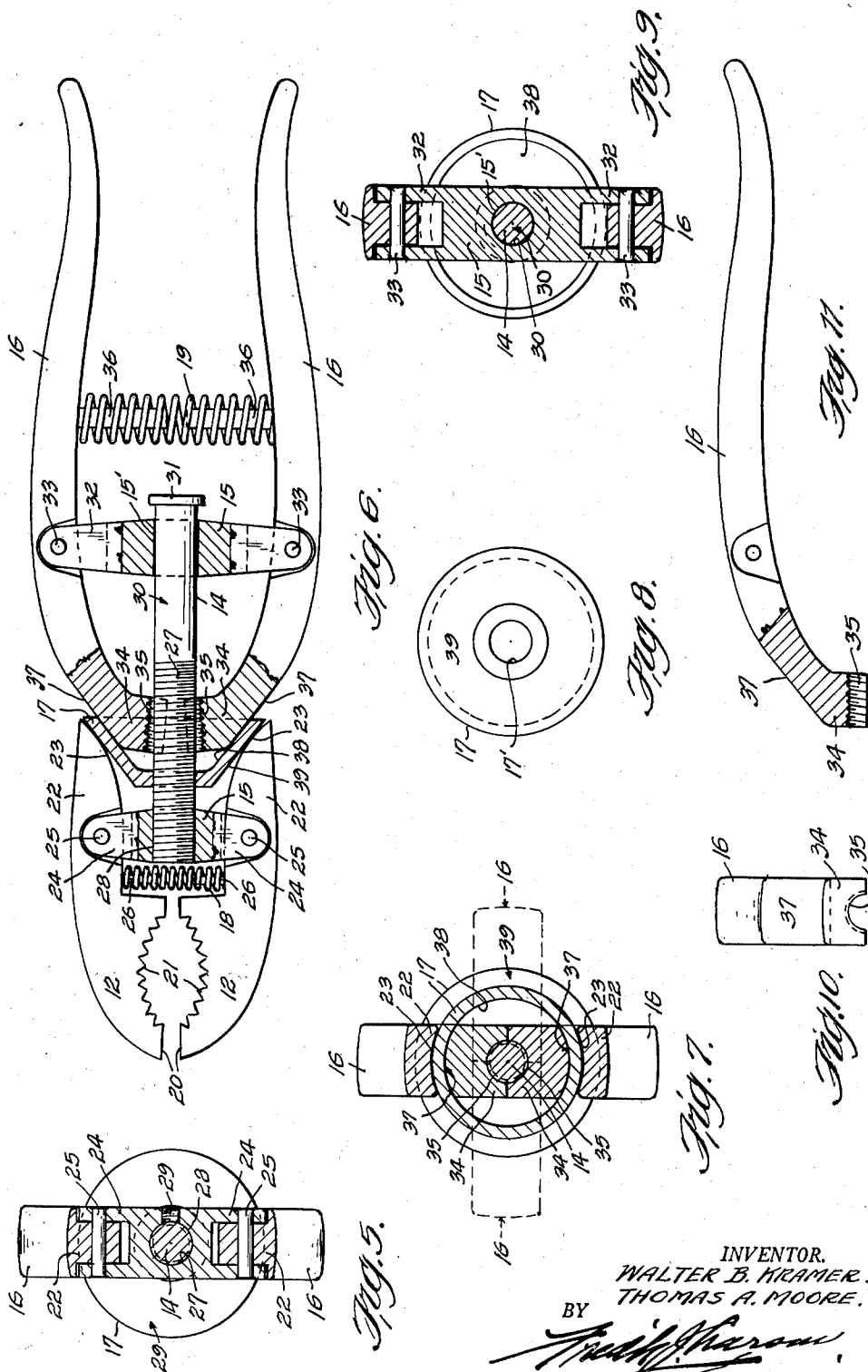
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CAM-CLOSING PIVOTED-JAW PLIERS HAVING DISPLACEABLE-HALF-NUT ACTUATOR

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2 Claims. (Cl. 81-49)

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This invention relates to pliers.

The primary object of the invention is to provide a pair of pliers, the handles of which can be rotated independently of the gripping jaws to apply additional gripping pressure to the gripping jaws.

A further object of the invention resides in providing a plier whereby hand gripping pressure against the handles is not necessary in order to hold the gripping jaws in their gripping positions relative to each other.

A further object of the invention is to provide a plier wherein a gripping pressure of the gripping jaws cannot be released before the operating handles have been rotated with relation to the gripping jaws so as to allow pivotal movement of the operating handles.

A further object of the invention is to provide a plier which may be quickly and conveniently adjusted to grip parts or articles of various diameters.

A further object of the invention resides in providing a plier which is adjustable to grip parts of various shapes and diameters, and which may be locked without maintaining hand gripping pressure against the operating handles.

A still further object of the invention is to provide a plier to overcome certain practical objections to, and defects in pliers of the conventional types.

Other objects and advantages of the invention will be apparent from the following description.

In the accompanying drawings forming a part of this application, like characters of reference denote similar parts throughout the several views.

Referring to the drawings:

Fig. 1 is a front end view of the pliers, the operating handles being shown also in dotted lines in a rotated position relative to the gripping jaws.

Fig. 2 is a side elevation of the pliers, the gripping jaws being shown in fully closed position.

Fig. 3 is a plan view of the pliers.

Fig. 4 is a side elevation of the pliers, the gripping jaws being shown as fully open.

Fig. 5 is a vertical sectional view taken on line 5-5 of Fig. 1.

Fig. 6 is a view partly in side elevation and partly in vertical sectional elevation, the operating handles being rotated anti-clockwise sufficient to slightly separate the gripping ends of the gripping jaws to allow the handle screw-threads to be retracted from the screw-threaded handle support.

Fig. 7 is a vertical sectional view taken on line 7-7 of Fig. 1.

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Fig. 8 is a front elevation of the bell-shaped jaw operating pressure ring.

Fig. 9 is a vertical sectional view taken on line 9-9 of Fig. 1.

Fig. 10 is a front end view of one of the operating handles.

Fig. 11 is a view partly in side elevation and partly in sectional elevation of one of the operating handles.

The invention consists of a pair of rocking gripping jaws each carried by separate pivot pins supported by a connecting spacing member, a pair of operating handles each carried by separate pivot pins supported by a connecting spacing member slidably supported on a screw-threaded member projecting centrally from the spacing members carrying the gripping jaws, a floating bell-shaped pressure transmitting ring mounted centrally on the screw-threaded member and disposed between the inner ends of the gripping jaws and the inner ends of the operating handles and wherein the inner ends of the operating handles are screw-threaded to provide a separable tapped hole for engagement with and disengagement from the screw-threaded member.

Briefly, the pliers comprise a pair of like gripping jaws 12, a yoked connecting member 13 for supporting the jaws, a stem designated, generally, as 14 projecting from the yoked member 13, a yoked connecting member 15 slidably mounted upon the stem 14, a pair of like operating handles 16 pivotally supported by the last mentioned yoked member, and a bell-shaped ring 17 slidably mounted on the stem 14 and engageable with both the gripping jaws and the operating handles, a coiled spring 18 interposed between the gripping jaws, and a coiled spring 19 interposed between the operating handles.

Each gripping jaw 12 is provided with a plane gripping surface 20 and an arcuately shaped serrated gripping surface 21. Each jaw 12 also includes a rear jaw portion 22 having a convexed inner face 23.

The yoked connecting member 13 is provided at each end with a bifurcated portion 24 to receive the rear portions 22 of the jaws 12. Each portion 22 of the jaws 12 is pivotally connected, at its respective bifurcated end portion 24 of the connecting member 13, by means of a pivot pin 25. The coiled spring 18 is interposed between the forward end portions of the rear jaw portions 22 to exert pressure to open the gripping jaws 12 and the spring 18 is guided and located at its ends by pins 26 anchored in the jaw portions 22.

The stem designated, generally, as 14, is pro-

vided for a portion of its length with screw-threads 27 and the stem is screw-threadedly connected with and projects rearwardly from a screw-threaded opening 28 centrally of the yoked connecting member 13. The stem 14 is secured to the member 13 by means of a set screw 29 so as to lock the stem against rotary and longitudinal displacement relative to the connecting member 13. The rearmost end portion 30 of the stem 14 has no threads and is smooth and the stem 14 is provided at its free end with a flanged head 31.

The yoked connecting member 15 is slidably mounted on the non-screw-threaded end portion 30 of the stem and is provided at each end with a bifurcated portion 32 to receive the operating handles 16 a suitable distance back from the forward end portions thereof. Each operating handle 16 is pivotally connected at its respective bifurcated end portion 32 of the yoked connecting member 15 by means of a pivot pin 33.

The inwardly projecting forward end or head portion 34 of the operating handles 16 are each provided with semi-cylindrical screw-threads 35, as clearly shown in Fig. 10, which are adapted for engagement and disengagement with the screw-threads 27 on the stem 14, as will be more clearly apparent hereinafter. The screw-threads 35 on the forward ends of the operating handles 16 are normally held in screw-threaded engagement with the screw-threads 27 on the stem 14 by means of the coiled spring 19 arranged between the handles 16 and guided against displacement by means of pins 36 carried by the operating handles 16.

The outer face of the forward end 34 of each operating handle 16 is inclined to provide a cam face 37 for normal engagement with the inner face 38 of the bell-shaped ring member 17, which member is slidably mounted upon the screw-threaded end portion 27 of the stem 14.

The outer face 39 of the bell-shaped ring member 17 is normally in engagement with the convexed inner surface 23 of the rearwardly projecting portions 22 of the gripping jaws 12 due to the action of the coiled spring 18 arranged between the gripping jaws 12.

Operation

Assuming the plier jaws 12 are locked in the gripping position, as shown in Fig. 1 and gripping an object designated 40, and it is desired to open the jaws 12, the operator turns the handles 16 counter-clockwise several turns which gradually and slightly opens the jaws 12 by action of the spring 18 sufficient to allow the operating handles 16 to be moved by hand gripping pressure toward each other sufficient to disengage the handle head screw-threads 35 from engagement with the stem screw-threads 27 to allow the yoked handle connecting member 15 to be moved rearwardly upon the non-screw-threaded portion 30 of the stem 14 a sufficient distance to fully open the jaws 12, as clearly shown in Fig. 4 by action of the spring 18.

When it is desired to grip an object with the jaws 12, the operator grips the handles 16 to disengage the handle screw-threads 35 from the stem screw-threads 27, which allows the handles and member 15 to be moved forwardly to a position where the jaws 12 lightly grip the object to be held between the jaws. If the light gripping action of the jaws 12 is not sufficient to prevent the jaws 12 turning on the object being held, the operator turns the handles 16 in unison clockwise, causing the handle screw-threads 35 to climb for-

ward on the stem screw-threads 27. This action causes the cam faces 26 on the handles to exert additional pressure on the bell-shaped ring 17 and the ring forces the convexed faced rear portions 22 of the jaws to be further spread apart causing additional gripping pressure to be applied to the object being held by the jaws 12. Anytime the jaws 12 firmly grip an object, hand pressure may be relieved on the operating handles 16, and the jaws 12 will still remain firmly gripped against the object between the jaws. It is believed clearly apparent that to apply additional gripping pressure to the gripping jaws 12, all that is necessary to do is to turn the handles 16 clockwise to secure the desired pressure effect. Due to the bell-shaped ring interposed between the rear ends of the jaws 1 and the cam surfaces at the forward ends of the handles, and the handle screw-threads engaging the stem screw-threads, it is impossible for the jaws to be released from the object until the handles are turned counter-clockwise sufficient for the handles to be actuated toward each other to release engagement of the handle screw-threads from the stem screw-threads so as to allow the connecting member 15 and the handles to be moved away from the jaws 12. This moving away action of the member 15 releases pressure against the ring 17, and thus releases ring pressure against the inner curved faces on the rear ends of the gripping jaws 12.

From the foregoing description, it is clearly apparent that any amount of pressure can be easily and quickly applied to the rear ends of the gripping jaws for transfer to the gripping ends of the jaws by merely turning, or rotating the handles 16 clockwise and without applying hand gripping pressure to the operating handles 16. It is clearly apparent that gripping pressure is applied to the gripping jaws by rotation of the operating handles 16, and that this pressure is retained even though the hand is removed from the operating handles.

The many advantages of the herein described invention will readily suggest themselves to those skilled in the art to which it appertains.

It is to be understood that the form of the invention herein shown and described is to be taken as a preferred example of the same, and that various changes in the shape, size and arrangement of the several parts involved may be resorted to, without departing from the spirit of the invention, or the scope of the appended claims.

What we claim is:

1. A plier comprising two like gripping jaws having rear convexed cam faces, a yoked member to which the jaws are pivotally connected, a stationary stem projecting rearwardly from the yoked member having a screw-threaded forward end portion, a non-screw-threaded rear end portion and a head on the free end of the stem, a pair of operating handles having forward cam faces, inwardly projecting heads on the inner ends of the handles, matching internal screw-threads on said handle heads adapted for engagement with and disengagement from the stem screw-threads, a yoked member slidably mounted on the non-screw-threaded end of the aforesaid stem to which the operating handles are pivotally connected, a bell shaped ring having a central opening mounted for sliding movement on the screw-threaded end of the stem, an expansion spring disposed between the operating handles,

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and an expansion spring interposed between the gripping jaws.

2. In a plier, the combination with a yoked member, a screw-thread member having a non-threaded rear end portion projecting rearwardly from the yoked member, a second yoked member slidably and rotatably mounted on the non-threaded end of the screw-threaded member, a pair of gripping jaws each having plane gripping surfaces and arcuately shaped serrated gripping surfaces, the rear end portions of the gripping jaws having convexed inner faces, means pivotally connecting the rear end portions of the gripping jaws to the ends of the first mentioned yoked member, a coiled expansion spring disposed between the rear end portions of the gripping jaws in advance of the first mentioned yoked member to urge the outer ends of the jaws toward each other, a bell-shaped member slidably mounted on the screw-threaded member having its outer face engageable with the inner convexed faces of the rear end portions of the gripping member, a pair of operating handles pivotally connected with the ends of the second mentioned yoked member, outer cam faces on the forward ends of the operating handles engageable with

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the inner face of the bell-shaped member, matched screw-threads on the inner ends of the operating handles engageable with the screw-threaded member, and a coiled expansion spring disposed between the operating handles to the rear of the second mentioned yoked member to urge the matched screw-threads into engagement with the screw-threaded member.

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