

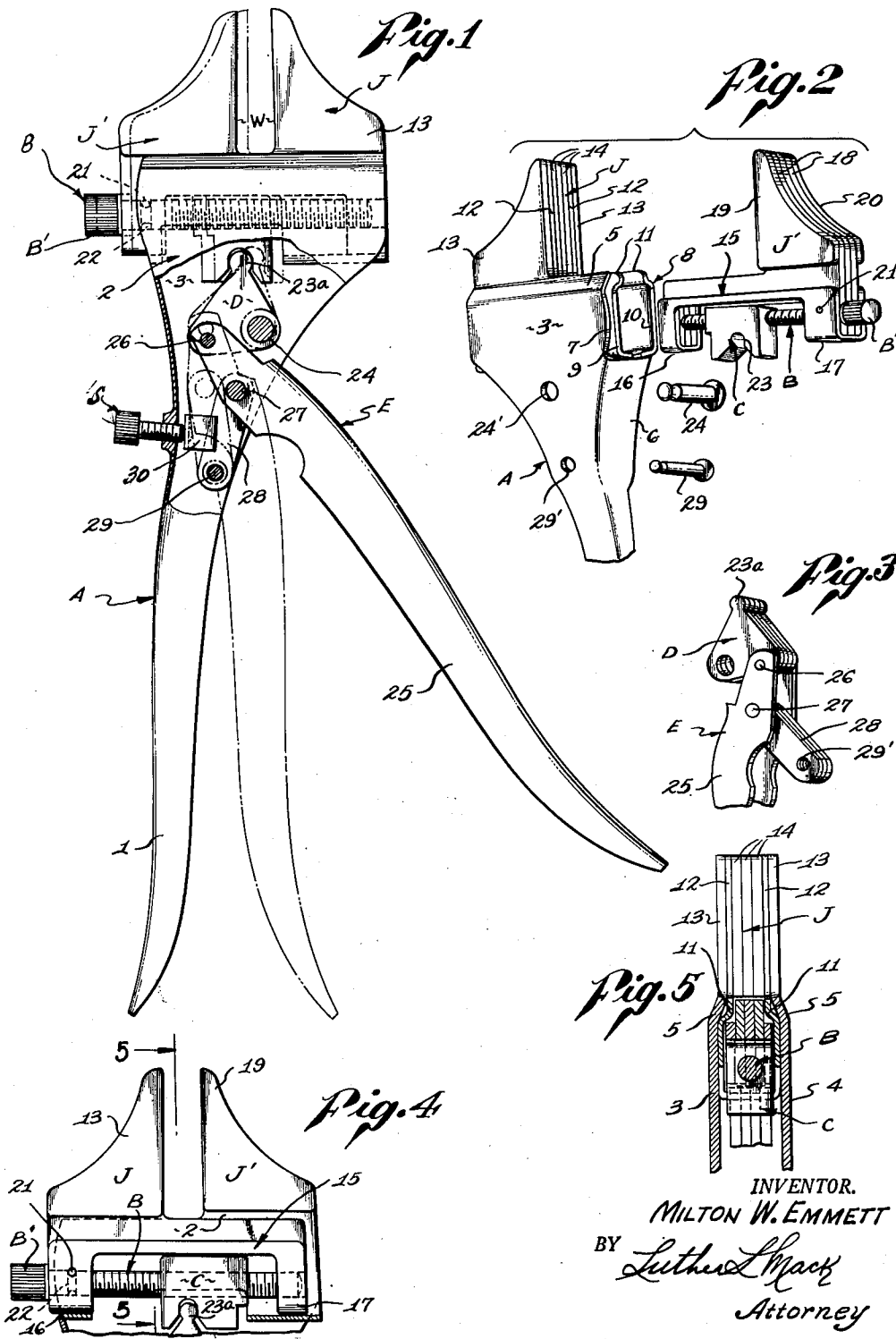
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TOGGLE-ACTUATED SLIDABLE SIDE JAW WRENCH

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TOGGLE-ACTUATED SLIDABLE SIDE JAW WRENCH

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4 Claims. (Cl. 81-88)

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This invention relates to pliers of the same general character and for the same purpose as the device disclosed in my application for patent filed March 24, 1949, Serial No. 83,198, of which this application is a continuation in part. In its broadest aspect my present improvements have for an object the provision of pliers having relatively movable jaws so connected that one jaw may be adjusted relative to the other jaw initially to correspond to an approximate dimension of a piece of work and then finally adjusted by movement of one handle relative to the other to an extent which will positively grip and hold the work, even when the handles are released, without employing a special locking device.

In my said co-pending application the pliers therein disclosed show the two handles directly pivoted one to the other, an adjusting device for nominally spacing the jaws apart to a desired extent and a direct connection between one of the handles and an element of the adjusting device whereby a special lock is required to retain the jaws in gripping engagement with the work.

In the instant structure it is an object to dispense with a device for locking the handles and jaws to grip and hold the work and in lieu thereof to provide a toggle connection between the two handles and one of the jaws which, when work is positioned between the jaws and one handle is moved, the other hand will move the toggle elements beyond dead center positions and thus firmly grip and hold the work clamped between the jaws until the handles are spread apart in order to release the work.

A more specific object is to provide pliers for the purpose described including a first handle member having a jaw fixed thereto, and a head for slidably supporting a relatively movable jaw thereon, an adjuster borne by said head, a second handle member, and a toggle device connecting the second handle member with the first handle member and the movable jaw through said adjuster.

Other and more detailed objects may appear as the description progresses.

I have shown a preferred form of pliers embodying my invention in the accompanying drawing, subject to modification, within the scope of the appended claims, without departing from the spirit of the invention. In said drawing:

Fig. 1 is a plan view, partly broken away to show an arrangement of parts when the jaws are positioned to correspond to an approximate

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dimension of a piece of work to be gripped thereby;

Fig. 2 is an exploded view with parts omitted; Fig. 3 is a perspective view of the members forming the toggle connection between the adjuster and the two handles;

Fig. 4 is a view of the two jaws, the adjuster and associated parts shown fragmentarily; and

Fig. 5 is a sectional view of the structure of Fig. 4 on line 5-5 thereof.

Briefly described, my improved pliers includes a first member formed with a handle 1 and an integral head 2, of sheet metal, bent into a U cross section throughout the extent of the handle and the head. Head 2 is substantially wider than handle 1 and provides sides 3 and 4 which are bent inwardly at 5, 5 and the connecting web 6 is recessed at 7 to provide a transverse support for the shank 8 of a stationary jaw J. Said shank is formed of members 9 and 10 which are bent at 11, 11 to conform to the bends 5, 5 of sides 3, 4 and have extensions 12, 12 which combine with extensions 13, 13 of sides 3, 4 and a plurality of similarly formed intermediate plates 14, 14, etc. to form jaw J.

Shank 8 of jaw J forms a guideway for shank 15 of a jaw J' which is movable relative to jaw J. Shank 15 has spaced end bearing portions 16 and 17 and includes a plurality of plates 18, 18, etc. securely held in bearing portions 16 and 17 and outer plates 19 and 20 which together form a movable jaw J'.

An adjuster screw B is rotatably supported in bearings 16 and 17 and held against axial movement as by means of a retaining pin 21 extended through sides 3, 4 of member A and an annular groove 22 of screw B. A nut C is threaded onto screw B between bearings 16 and 17 and has a recess 23 in which a portion 23a of an actuator D seats, said actuator being pivotally supported on a pin 24 borne by sides 3, 4, of member A.

Adjuster B has a head B' adjacent bearing 17 which when turned will correspondingly move an index member in the form of a nut C and swing actuator D. A second member E having a handle 25 is pivoted at 26 to actuator D and at 27 to a toggle link 28 which in turn is pivotally supported on a pin 29 secured to member A at 29'. Thus, handle member E instead of being locked and supported directly on member A is indirectly supported thereon through its connection with toggle link 28 and actuator D.

When at times it may be desired to use the pliers conventionally, as for only temporarily holding a piece of work and without locking the

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jaws, through the medium of an adjusting screw S on the web of handle A and a swivelled saddle 30 borne by the inner end of screw S, the toggle link 28 may be restrained from movement to a point short of dead center position. Saddle 30, to such end, preferably straddles the link 28 and is not rotatable with screw S. In such case handles A and E must be contracted for holding the work, and the work will be released when the handles are released.

The index member C being axially adjustable on the adjustor screw B by reason of the fact that said screw is merely rotatable in its bearings 16 and 17 while the index member is restrained from rotative movement between the sides 3, 4 of member A, the actuator D is swung on its pin 24 which seats in holes 24' as the jaw J' is set at a desired distance from jaw J to approximate a dimension of a piece of work intended to be gripped by and held between the jaws. Member E and link 28 are of course correspondingly moved in such an operation but the pivot 27 during such preliminary adjustment remains slightly to the right of a dead center line of pivots 26 and 29, as shown in Fig. 1, hence to the right of dead center position. When, however, a piece of work W is positioned between jaws J and J' and member E is moved toward member A the pivot 27 will be moved to the left beyond dead center position and member E will be locked with the jaws in clamping engagement with the work.

The essence of this invention, therefore, resides in the provision of the two handle members indirectly fastened together and toggle connected with each other and with an index member under the control of an adjustor which enables an operator to set the movable jaw relative to the stationary jaw to correspond to the normal or approximate dimensions of an object to be gripped by the pliers and thereafter when the work is inserted between the jaws to firmly clamp the work in position by a movement of one of the handles relative to the other so as to move the toggle connection over dead center position thereby eliminating the necessity for any supplementary lock applied to the two handle members.

I claim:

1. Pliers comprising: a first handle member formed with a head having spaced sides, and a stationary jaw, said head being formed to provide a transverse guideway adjacent the base of said stationary jaw, a movable jaw opposite said stationary jaw and having a shank slidable in said guideway, an adjustor rotatably supported in spaced bearings of said shank and extended through said guideway, an index member threaded onto said adjustor and arranged for adjustment in a plane paralleling that of the movable jaw and corresponding to the rotation of said adjustor, an actuator pivoted at a fixed point to the handle of said first member and having a portion seated in a recess of said index member, a second handle member, a toggle link pivotally connecting the handles of said first and second members, the handle of said second member being pivotally connected with said actuator, whereby upon operation of said adjustor to set said jaws at initial work gripping positions the movement of said second handle member to an extent to move said toggle link and said actuator beyond dead center positions will clamp said work between said jaws until the toggle connection is broken.

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2. Pliers comprising: a first handle member formed with a head having spaced sides, a stationary jaw, said head being formed to provide a transverse guideway adjacent the base of said stationary jaw, a movable jaw opposite said stationary jaw and having a shank slidable in said guideway, an adjustor rotatably supported in spaced bearings of said shank and extended through said guideway, an index member threaded onto said adjustor and arranged for adjustment in a plane paralleling that of the movable jaw and corresponding to the rotation of said adjustor, an actuator pivoted to the handle of said first member and having a portion seated in a recess of said index member, a second handle member, and a toggle connection between said handle members and said actuator effective by contracting the second handle member to move the toggle connected elements beyond dead center position to clamp the work between said jaws until the second handle member is operated to retract the movable jaw and release the work by breaking the toggle joint, the pivot connection of the second handle member with the actuator being on the opposite side of the fulcrum of the second handle member from the anchor pivot of said toggle, so that when the second handle member is moved toward the first handle member to jaw closing position its fulcrum will move beyond a dead center line intersecting the toggle pivots.

3. Pliers comprising: a first handle member formed with a head having spaced sides, and a stationary jaw, said head being formed to provide a transverse guideway adjacent the base of said stationary jaw, a movable jaw opposite said stationary jaw and having a shank slidable in said guideway, an adjustor rotatably supported in spaced bearings of said shank and extended through said guideways, an index member threaded onto said adjustor and arranged for adjustment in a plane paralleling that of the movable jaw and corresponding to the rotation of said adjustor, an actuator pivoted to the handle of said first member and having a portion seated in a recess of said index member, a second handle member pivoted to the first handle member, a toggle link pivotally anchored to the handle of said first member, the handle of said second member being pivotally connected at its fulcrum with said toggle link and outwardly therefrom with said actuator, whereby upon operation of said adjustor to set said jaws at initial work gripping positions the movement of said second handle member to an extent to move said toggle link and said actuator beyond dead center positions with respect to the fulcrum of the second handle member will clamp said work between said jaws until the toggle connection is broken, and manually operable means borne by the first handle member and bearing against said toggle link for restraining movement of the toggle link to less than dead center position, so as to temporarily grip but not lock the jaws on a piece of work.

4. Pliers comprising: a first handle member, a second handle member adjustable relative thereto, a head transversely disposed on said first handle member and formed with spaced sides for stationarily supporting a first jaw and adjustably supporting a second jaw for transverse movement relative to said first jaw, telescoping shanks on said jaws, an adjustor rotat-

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ably held on the shanks of said jaws, an index member adjustable axially on and by rotation of said adjustor and adapted to space said jaws to an extent corresponding to a nominal dimension of a piece of work, and toggle elements operatively connecting said handles with said index member for gripping said piece of work when one handle member is pivotally moved on the other to an extent to move said toggle elements over dead center position and thereby close the jaws on the piece of work until released by moving one handle member relative to the other, said toggle connections including: a pair of members pivotally anchored to the stationary handle member on opposite sides of the axis of the second handle member, one of said toggle members being operatively engaged with said index member, another toggle element being connected with said second handle at a point intermediate the axes of the two toggle members, the movement of the second handle member serving to lock said toggle elements over dead center position so as to cause said

jaws to grip and hold the work against dislodgement.

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