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ADJUSTABLE CAM ACTUATED PLIERS

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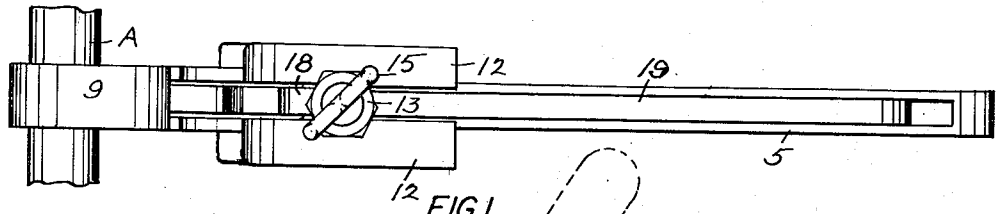


FIG. 1

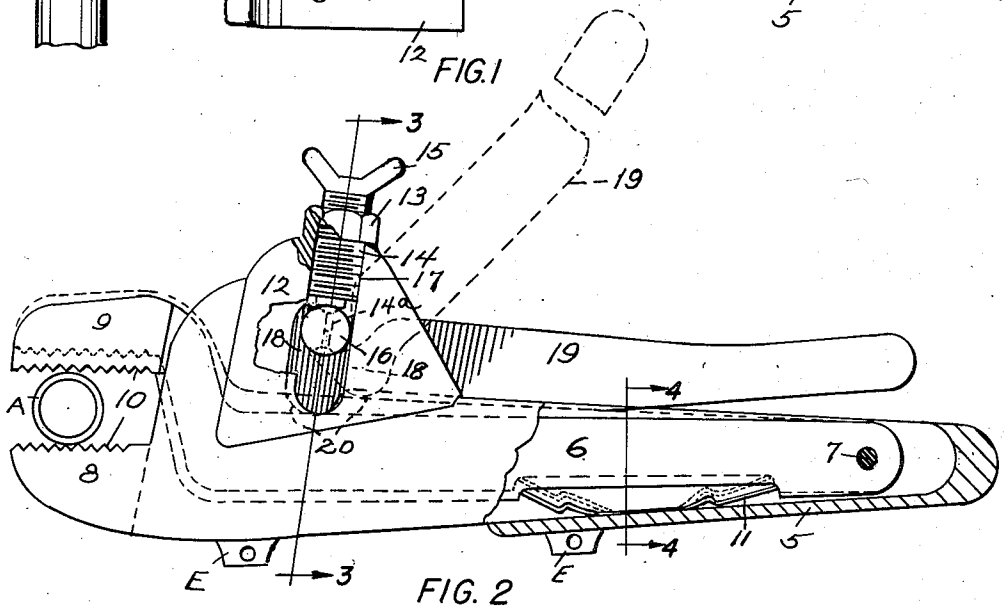


FIG. 2

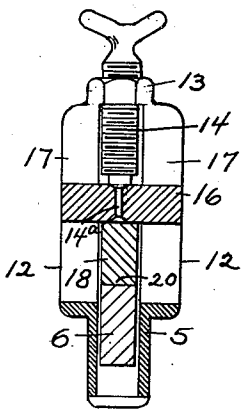


FIG. 3

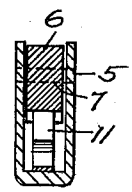


FIG. 4

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ADJUSTABLE CAM ACTUATED PLIERS

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5 Claims. (Cl. 81—330)

This invention relates to tools and more specifically to pliers of the vise type comprising a pair of pivotally connected handles carrying toothed jaws, together with means for locking the jaws into forcible engagement with an object to be gripped, held, turned or otherwise manipulated. Thus the gripping action is maintained even after the handles have been released from manual actuation.

It is the primary object of the invention to provide a device of the character indicated which will comprise a minimum number of parts and those of a very rugged and long lived construction. The several parts are so correlated and combined that the leverages exerted under manual actuation of the tool are of such order that but slight effort is required upon the part of the user to effect a very powerful gripping action by the jaws upon the object to be held.

The tool, if secured to a work bench is also adapted to serve as a small bench vise.

The advantages of the tool will be best appreciated after consideration of the accompanying drawing, wherein:

Fig. 1 is a plan view;

Fig. 2 is a side elevation, partly in section, of a tool constructed in accordance with the invention;

Fig. 3 is a transverse section on line 3—3 of Fig. 2; and

Fig. 4 is a transverse section upon line 4—4 of Fig. 2.

Referring to the drawing, wherein like numerals designate corresponding parts throughout the several views, 5 and 6 designate a pair of elongated handles which are pivotally connected adjacent their rear ends by a pivot 7. At their forward ends these handles carry jaws 8 and 9 the confronting faces of which carry teeth 10.

Handle 5 is of channel formation in cross section with the top of the channel being open. Handle 6 is disposed within the channel of handle 5 and is biased to open position (that is in a direction to move the jaws 8 and 9 apart) by a leaf spring 11, which spring is disposed between handle 6 and the bottom of the channel of handle 5. A yoke-like abutment of inverted U-shape comprising the side walls 12 and a connecting head 13 upstands from the side walls of the channeled handle 5. A vertical screw 14, threaded through head 13 carries a manipulating projection 15. The lower end of screw 14 is reduced to form a stem 14*a* which has rotative engagement in a transverse circular pivot block 16. The outer ends of this pivot block travel in vertical slots 17 of the walls 12 of the yoke and thus the pivot block is held against turning bodily about the axis of screw 14. The head 18 of a lock lever 19 is pivoted upon pivot block 16. This lock lever comprises the elongated handle 19 and its head 18 and a cam heel 20, said heel consisting of a protuberant portion of head 18. This cam heel bears upon and acts against the upper face of handle 6 and thus serves to move the jaw 9 forcibly toward jaw 8 as the lock lever is swung to the full line position of Fig. 1. At the termination of the movement of the outer or free end of the lock lever toward handle 5 the cam heel

will have been moved to past center position to wit, to a position where the tendency for the jaws to move apart will, through cam heel 20, cause lock lever 19 to tend to move toward handle 6, as in full lines, in Fig. 2. Thus the grip of the teeth 10 upon an object gripped, as indicated at A, will be maintained indefinitely and after manual actuation of the jaws toward each other, has ceased. The length of the lock lever, in conjunction with the direction of movement of the heel over the upper face or edge of handle 6, is such that very slight pressure upon the lever by the user will exert very great pressure upon the jaws in their gripping and holding action.

If desired, handle 5 may be provided with perforated ears E by which the tool may be rigidly affixed to a work bench for use as a small bench vise.

It will be seen that the general elongated shape of the tool is plier like. For very light work the rear portion of the handles may be grasped in the palm of the hand and squeezed together to bring the jaws into engagement with an object A, without use of the lock lever, but when greater resistance is to be overcome the lock lever may be brought into play as described. Vertical adjustment of the pivot block 16 by manipulation of screw 14 renders it possible to adjust the movement of the jaws to grip objects of different sizes.

It is to be noted that the handles 5 and 6 themselves constitute the basic frame of the tool and because of their length and size the tool as a whole is rendered very strong and rugged. Further, it is to be noted that the handles are long and of almost equal length and that their point of pivoting to each other is near their rear ends. In addition the handle 6 is of such width that it lies and is housed completely within housing 5, throughout all of its length which lies rearwardly of cam heel 20 or within the plane of action of lock lever 19. Thus it will be seen that the width of what has to be gripped in the palm of the user comprises only the combined width of handle 5 and lock lever 19 and not the combined widths of handles 5 and 6 and lock lever 19; as would be the case if handle 6 were not housed in handle 5, as described.

When used as a small bench vise the tool is secured to the upper front wall of a work bench by screws passed through ear E and with the tool proper projecting upwardly of the top of the work bench. In other words, the tool then lies in the position of Fig. 2 with the lock lever in position to be swung in a vertical plane and away from the work or part held. This part A then projects horizontally beyond the plane of the tool and in a convenient position to be acted upon by a threading die, hack saw, file or other tool.

It is to be understood that the invention is not limited to the precise construction set forth but that it includes within its purview whatever changes fairly fall within either the terms or the spirit of the appended claims.

I claim:

1. A tool of the character described comprising a pair of elongated handles pivotally connected to each other adjacent their rear ends and each carrying a work engaging jaw at its forward end, a fixed abutment carried by one of said handles, an adjusting screw having threaded engagement with said abutment, a pivot block movable bodily under the action of said screw, a lock lever pivoted upon said pivot block and comprising an elongated rearwardly extending handle and a cam heel, said cam heel engaging and imparting movement to the other of said handles.

2. A tool of the character described comprising a pair of elongated handles pivotally connected to each other adjacent their rear ends and each carrying a work engaging jaw at its forward end, a fixed abutment carried

by one of said handles, an adjusting screw having threaded engagement with said abutment, a pivot block movable bodily under the action of said screw, a lock lever pivoted upon said pivot block and comprising an elongated rearwardly extending handle and a cam heel, said cam heel lying in the lateral plane of and directly engaging and acting upon the upper edge of the other of said handles.

3. A tool of the character described comprising a pair of elongated handles each having a toothed jaw at one end, a first one of said handles being of channel formation with an open top and the second and other of said handles lying within said channel with its upper edge exposed at the top of said channel, a pivot extending laterally through and pivotally uniting said handles adjacent their rear ends, spring means acting between said handles in a direction tending to move their jaw portions away from each other, a circular pivot block movable bodily toward and from the first handle and projecting transversely of the said handle, a cam lever comprising a head pivotally engaged with the pivot block, an elongated lever portion extending rearwardly from said head and a cam heel bearing upon the upper edge of the second handle.

4. A tool of the character described comprising a pair of elongated handles each having a toothed jaw at one end, a first one of said handles being of channel formation with an open top and the second and other of said handles lying throughout the major portion of its length, wholly within said channel with its upper edge exposed adjacent the top of said channel, a pivot extending laterally through and pivotally uniting said handles adjacent their rear ends, spring means acting between said handles in a direction tending to move their jaw portions away from each other, cam means carried by the first and channeled handle and acting upon the top edge of the second handle for forcibly moving said jaws toward each other and against the tension of said spring, a shiftable pivot block for the cam means, an adjusting screw engaging and bodily shifting said pivot block, an abutment carried by the first handle and interengaging means between the pivot block and abutment constructed to hold the block against bodily turning with the screw.

5. A tool of the character described comprising a pair of elongated handles each having a toothed jaw at one end, a first one of said handles being of channel formation with an open top and the second and other of said handles lying throughout the major portion of its length, wholly within said channel with its upper edge exposed adjacent the top of said channel, a pivot extending laterally through and pivotally uniting said handles adjacent their rear ends, spring means acting between said handles in a direction to move their jaw portions away from each other, cam means carried by the first and channeled handle and acting upon the top edge of the second handle for forcibly moving said jaws toward each other and against the tension of said spring, a shiftable pivot block for the cam means, an adjusting screw engaging and bodily shifting said pivot block, an abutment carried by the first handle and interengaging means between the pivot block and abutment constructed to hold the block against bodily turning with the screw, said interengaging means comprising a slot in the abutment in which an end of the pivot bolt travels in its movement under the action of said screw.

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