Dec. 3, 1957 E. R. McCALEB 2,814,860

TOOLS FOR APPLYING LINE CLAMPS

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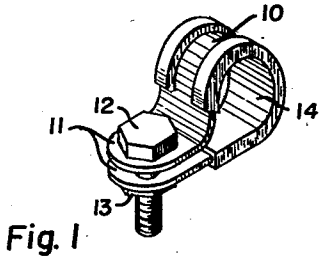


Fig. 1

Fig. 2

Fig. 3

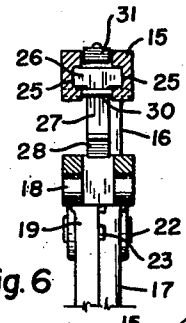


Fig. 6

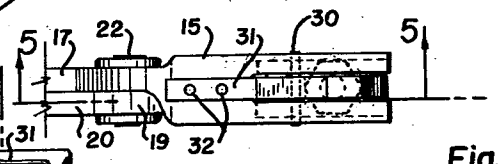


Fig. 4

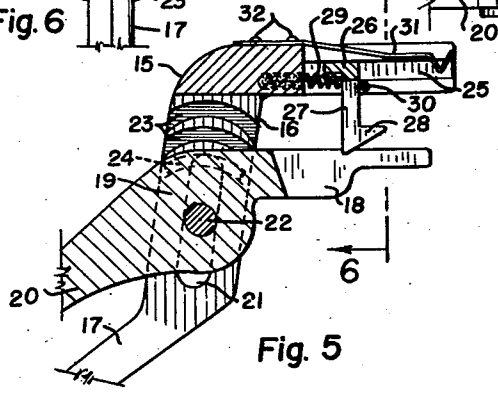


Fig. 5

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TOOLS FOR APPLYING LINE CLAMPS

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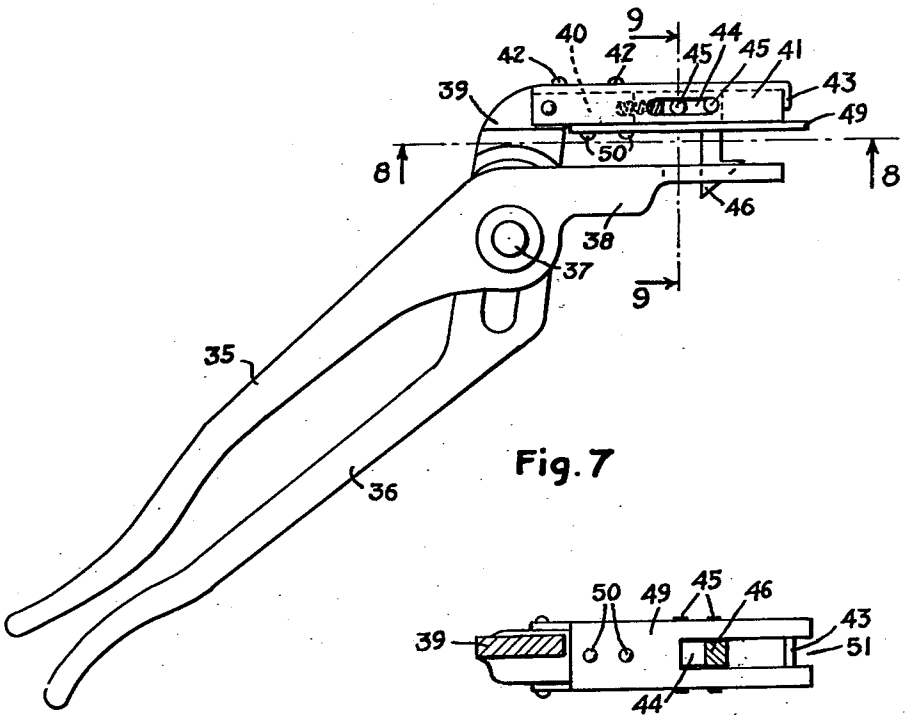


Fig. 7

Fig. 8

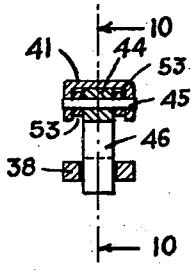


Fig. 9

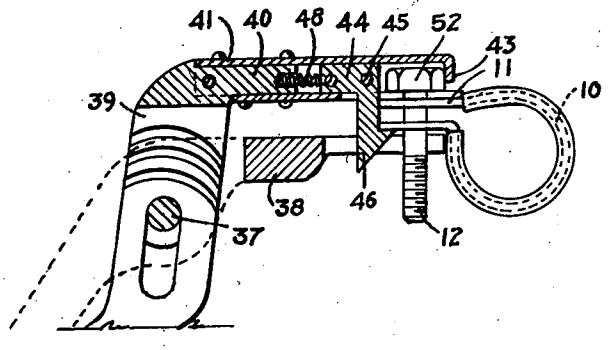


Fig. 10

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TOOLS FOR APPLYING LINE CLAMPS

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13 Claims. (Cl. 29—268)

This invention relates to a plier-like tool for installing line clamps of the type used for securing wiring, conduits, pipes, etc. to supporting structures. It is more particularly designed for use on the type of clamp known as an "Adel" clamp such as illustrated in prior Patent No. 2,215,283.

Such a line clamp comprises a metallic band bent in an annular loop, with two projecting ears through which a clamp bolt is passed to close the clamp around the line to be supported and to secure the clamp to a supporting structure. It is often difficult to force the ears of such a line clamp toward each other around the wiring or other material and to retain the ears in the contracted position while the clamp bolt is being secured therein.

The principal object of this invention is to provide a simple plier-like tool which will contract the ears and which will securely retain the clamp bolt and the ears of one or more line clamps in contracted relation on the clamp bolt so that the latter can be readily inserted in a receiving opening in a supporting structure for receipt of a retaining nut.

Another object is to so construct the tool that it will not only support one or more line clamps and a clamp bolt in assembled relation, but which can also be used for clamping and retaining the assembled clamps against an attachment clip or other support so that the retaining nut may be readily threaded onto the bolt for securing the clamps in place on the clip or support.

Other objects and advantages reside in the detail construction of the invention, which is designed for simplicity, economy, and efficiency. These will become more apparent from the following description.

In the following detailed description of the invention, reference is had to the accompanying drawing which forms a part hereof. Like numerals refer to like parts in all views of the drawing and throughout the description.

In the drawing:

Fig. 1 is a perspective view of the clamp of the "Adel" type to which this invention is more particularly applicable;

Fig. 2 is a side view of the improved clamping tool, illustrating it as it would appear when clamping the ears of a line clamp together upon a clamp bolt;

Fig. 3 is a similar side view partially broken away, illustrating the head portion of the tool, with a line clamp in place therein, and with the tool open ready to receive either additional clamps or a clamp-supporting element;

Fig. 4 is a top view of the head portion of the tool;

Fig. 5 is a longitudinal section, taken on the line 5—5, Fig. 4;

Fig. 6 is a cross-section, taken on the line 6—6, Fig. 5;

Fig. 7 is a side view of a second form of the improved line clamp tool;

Fig. 8 is a horizontal section looking upwardly on the line 8—8, Fig. 7;

Fig. 9 is a cross-section taken on the line 9—9, Fig. 7; and

Fig. 10 is a fragmentary longitudinal section taken on the line 10—10, Fig. 9.

A conventional line clamp of the type to which this improved tool is especially applicable is illustrated in Fig. 1 and comprises an elongated metallic band 10 bent in an annular loop and terminating in two oppositely positioned bolt ears 11 which are perforated to receive a clamp bolt 12 provided with a clamp nut 13. The band is lined with a channel shaped rubber lining 14 which is fitted about the inner surface and around the edges of the band 10.

The improved clamping tool comprises a first elongated bifurcated jaw member 15 formed on a shank portion 16, from which a first handle 17 extends, and a second bifurcated jaw member 18 positioned in coacting relation with the first jaw member. The second jaw member 18 extends from a pad portion 19 from which a second handle 20 projects in plier-like relation to the first handle 17.

The shank portion 16 of the first handle is provided with an elongated pivot opening 21 and a pivot bolt or rivet 22, mounted in the pad portion 19 of the second jaw member, extends through the slotted opening 21 to secure the two handles in pivotal relation. The surface of the shank portion 16 is provided with a plurality of arcuate grooves 23 into which an arcuate key 24, formed on the pad portion 19, engages. Such a pivot construction is conventional in adjustable pliers and allows the pivot rivet 22 to be adjusted longitudinally of the slotted opening 21 to vary the pivotal relation between the jaws 15 and 18.

The inwardly facing edges of the two furcations of the first jaw are longitudinally grooved to provide two parallel aligned slide grooves 25.

A pawl block 26 is slidably mounted in and extends between the opposite slide grooves 25 and is longitudinally slidable along the latter. A latch member 27 is formed on and extends downwardly from the slide block 26 between the furcations of both jaws and terminates in a forwardly-extending ear-engaging hook 28. The block and its latch member 27 are constantly urged forwardly in the slide grooves 25 by means of a compression spring 29 and the forward movement of the block 26 is limited by means of a fixed, transversely extending stop pin 30. A leaf retaining spring 31 is secured at its rear extremity on the jaw 15 by means of suitable attachment rivets 32. The spring 31 extends forwardly and downwardly between the furcations of the jaw 15.

In use, the head of one of the clamp bolts 12 is slid into the slide grooves 25 of the jaw member 15 with the shank of the clamp bolt extending downwardly between the furcations of both jaws. The clamp bolt is retained in place in the slide grooves 25 and against the stop pin 30 by the resilient frictional contact of the leaf spring 31.

The jaws are now opened and the bolt is inserted through the clamping ears 11 of a clamp band 10, and the handles 17 and 20 are urged together. This causes the jaw member 18 to urge the ears 11 together on the bolt 12 until they snap behind the hook 28 on the hooked latch member 27 as shown in Fig. 2. The jaw 18 can now be opened, and if the installation requires it, the ears 11 of a second line clamp may be slipped over the bolt 12 and forced against the ears 11 of the first line clamp by contraction of the jaws 15 and 18 until the ears of the second clamp snap behind the hook 28 of the latch member 27.

The tool will now securely retain the clamp bolts and line clamps in place on the first jaw member 15 so that the second jaw member 18 can be adjusted for greater spacing by shifting the pivot rivet 22 in the elongated pivot open-

ing 21, if necessary for urging the bolt 12 into a supporting structure for receiving the clamp nut 13. In Fig. 3, the tool is being used for inserting the bolt into an opening 33 in an angle member 34. Closure of the jaws will force the bolt shank through the angle member and into position to receive the clamp nut 13. When the nut 13 is in place, the insertion tool can be withdrawn from the bolt 12 and the nut is given its final tightening.

In Figs. 7 through 9, inclusive, a second form of the improved clamp is illustrated, having all of the objects, advantages, and principal features of the first form described.

The second form comprises two plier-like handles 35 and 36 similar to the previously described handles 20 and 17, respectively. The handles 35 and 36 are pivoted together similarly to the previously described handles upon a shiftable pivot bolt 37. The handle 35 terminates in a bifurcated jaw member 38 similar to the previously described jaw member 18. The handle member 36 is provided with a shank portion 39 similar to the previously described shank portion 6. In the second form, however, the shank portion 39 of the handle 36 terminates in a rectangular forwardly extending stub 40 to which and over which an inverted, stamped, channel jaw member 41 is secured by means of suitable attachment screws or rivets 42.

The channel jaw member 41 is preferably stamped from sheet metal to provide two parallel vertical side flanges and a forward transverse end flange 43. The side flanges are provided with longitudinally extending slide slots 44 through which the extremities of slide pins 45 project. The slide pins are formed on or affixed in a latch block 46 which is slidable between the side flanges of the jaw member 41 similarly to the slide block 26 previously described. The latch block 46 is constantly urged toward the end flange 43 by means of a compression spring 48 similar to the compression spring 29 previously described. The forward movement of the latch block is limited by the length of the slide slots 44.

A hooked latch member 47 having an inclined extremity is formed on and extends from the latch block 46 between the furcations of the jaw member 38. An elongated resilient retaining spring 49 of the leaf type is secured beneath the stub 40 of the handle 36 in any desired manner, such as by means of drive screws 50. The spring 49 is provided with a medial, longitudinally-extending, bolt-receiving slot 51 through which the hooked latch member 47 extends.

To insert one of the bolts 12 in the second form of the tool, the head of the bolt 12, indicated at 52, is hooked over the projecting extremity of the spring 49, and the spring is flexed away from the channel jaw member 41 to allow the bolt head to pass into the channel of the member 41 behind the end flange 43, as shown in Fig. 10, where it is retained by the natural resiliency of the spring 49. The ears 11 of the Adel clamps 10 are then passed over and pressed upon the shank of the bolt 12 exactly as described with the previous form. As the ears engage the inclined extremity on the latch block 46, they force the latch block against the bias of the spring 48. As the ears 11 pass the hooked extremity of the latch block 46, the latter will snap into engagement with the ears to retain the latter in place on the bolt, leaving the jaw member 38 free for use in pressing additional ears on the bolt or in pressing the bolt through desired supporting devices, as previously described.

While a specific form of the improvement has been described and illustrated herein, it is to be understood that the same may be varied within the scope of the appended claims, without departing from the spirit of the invention.

Having thus described the invention, what is claimed and desired secured by Letters Patent is:

1. A tool for installing a line clamp of the type consisting of a looped band with perforated protruding bolt ears through which a clamping bolt passes comprising: a bifurcated jaw member; a groove on the inner face of each furcation of the jaw member adapted to receive the head of the clamping bolt; means for releasably maintaining said head in said grooves; a latch member movably mounted in said jaw member; and means for forcing the ears of a line clamp onto a bolt retained in said jaw member so that said ears will be engaged by said latch member to maintain them against said jaw member.

2. A tool for installing a line clamp of the type consisting of a looped band with perforated protruding bolt ears through which a clamping bolt passes comprising: a first bifurcated jaw member; a groove on the inner face of each furcation of the jaw member adapted to receive the head of the clamping bolt; means for releasably maintaining said head in said grooves; a latch member movably mounted in said first jaw member; and a second bifurcated jaw member pivotally mounted in relation to the first jaw member so that its furcations will pass on opposite sides of the bolt retained in the first jaw member and adapted to force the ears of the line clamp into engagement with said latch member.

3. A tool for installing line clamps as described in claim 2 having spring means arranged to urge said latch member into engagement with said ears.

4. A tool for installing line clamps as described in claim 3 in which the latch member is mounted on a slide block slidably mounted in the grooves of the first jaw member so that it may move toward and away from said bolt.

5. A tool for installing line clamps as described in claim 4 in which the means for retaining the bolt head in the groove comprises a resilient leaf spring mounted on said first jaw member and positioned to resiliently engage the head of said bolt.

6. A tool for installing line clamps as described in claim 5 having a handle projecting from each jaw member in plier-like relation so that when said handles are urged together said jaw members will be urged together.

7. A tool for installing line clamps as described in claim 6 having means for varying the position of the pivot between said jaw members so as to vary the space between the latter.

8. A tool for installing line clamps as described in claim 7 having means for limiting the forward movement of said latch member.

9. A tool for installing a line clamp of the type consisting of a looped band with perforated protruding bolt ears through which a clamping bolt passes comprising: a jaw member; means acting to retain the head of the bolt in place in said jaw member; a latch member movably mounted in said jaw member and positioned to engage the ears of the line clamp as the latter are forced over said bolt so as to retain said line clamp and said bolt in place on said jaw member; and means connected with said jaw member forcing said ears into engagement with said latch member.

10. A tool for installing a line clamp of the type consisting of a looped band with perforated, protruding bolt ears through which a clamping bolt passes, comprising: an elongated, channel-shaped jaw member having side flanges; a latch block slidably positioned in said jaw member between said flanges; an end flange on said channel member adapted to retain the head of a bolt between said side flanges; resilient means urging said latch block toward said end flange; a hooked latch member extending from said latch block; and a second jaw member adapted to urge the ears of a line clamp over said bolt and toward said channel member so that said ears will be engaged by said hooked latch member.

11. A tool for installing a line clamp as described in claim 10 in which the hooked latch member is provided with an inclined extremity against which said ears contact to exert a wedging action against said latch member to urge the latch block against said resilient means.

12. A tool for installing a line clamp as described in claim 11 having a flexible leaf spring extending longi-

tudinally of the open side of said channel member, said spring having a medial bolt-receiving slot through which the hooked latch member and the shank of the bolt pass.

13. A tool for installing a line clamp as described in claim 12 having slide pins projecting laterally from said latch block, there being elongated slide openings formed in said side flanges for receiving and guiding the extremities of said pins.

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