Dec. 17, 1929. G. DONALDSON 1,740,392

COMBINATION PLIERS AND WIRE TWISTING TOOL

Filed Nov. 14, 1927 2 Sheets-Sheet 1

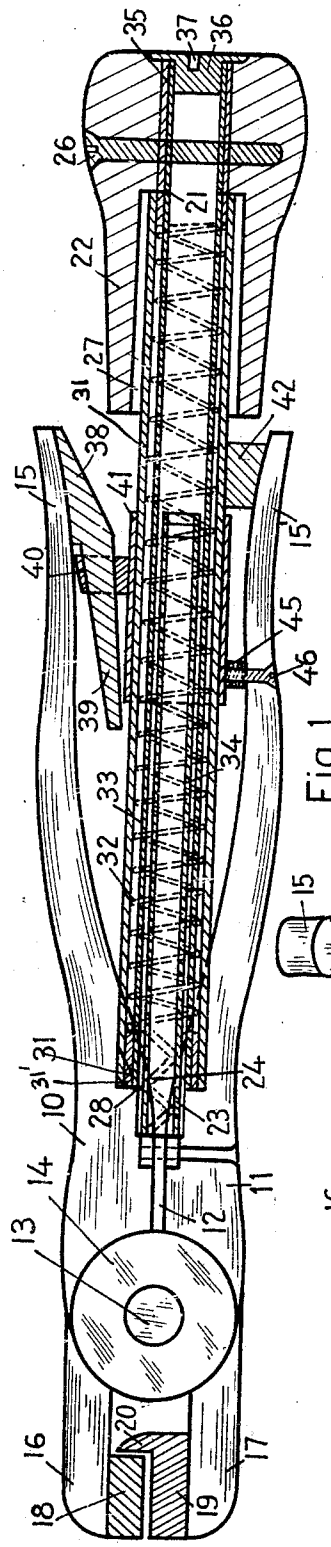


Fig. 1

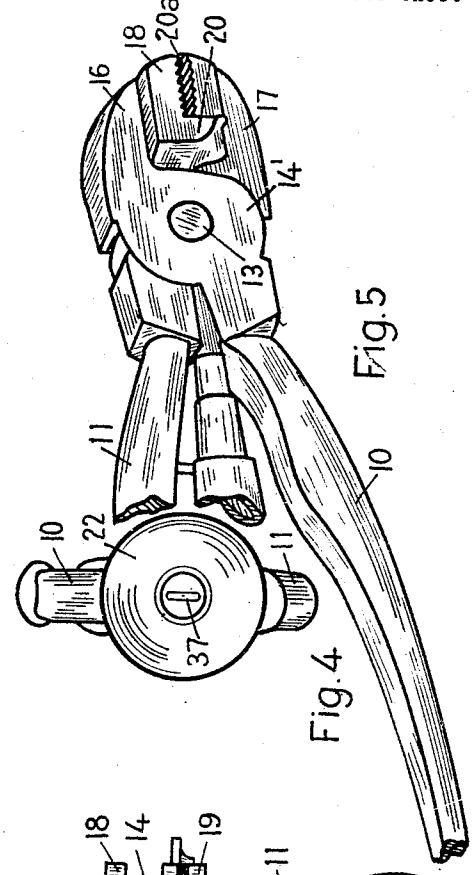


Fig. 5

Fig. 4

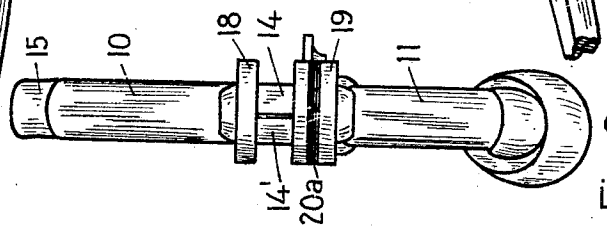


Fig. 3

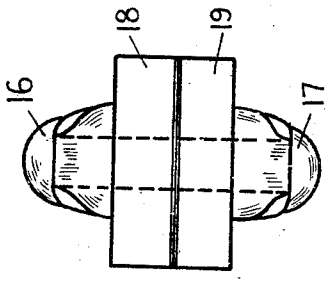


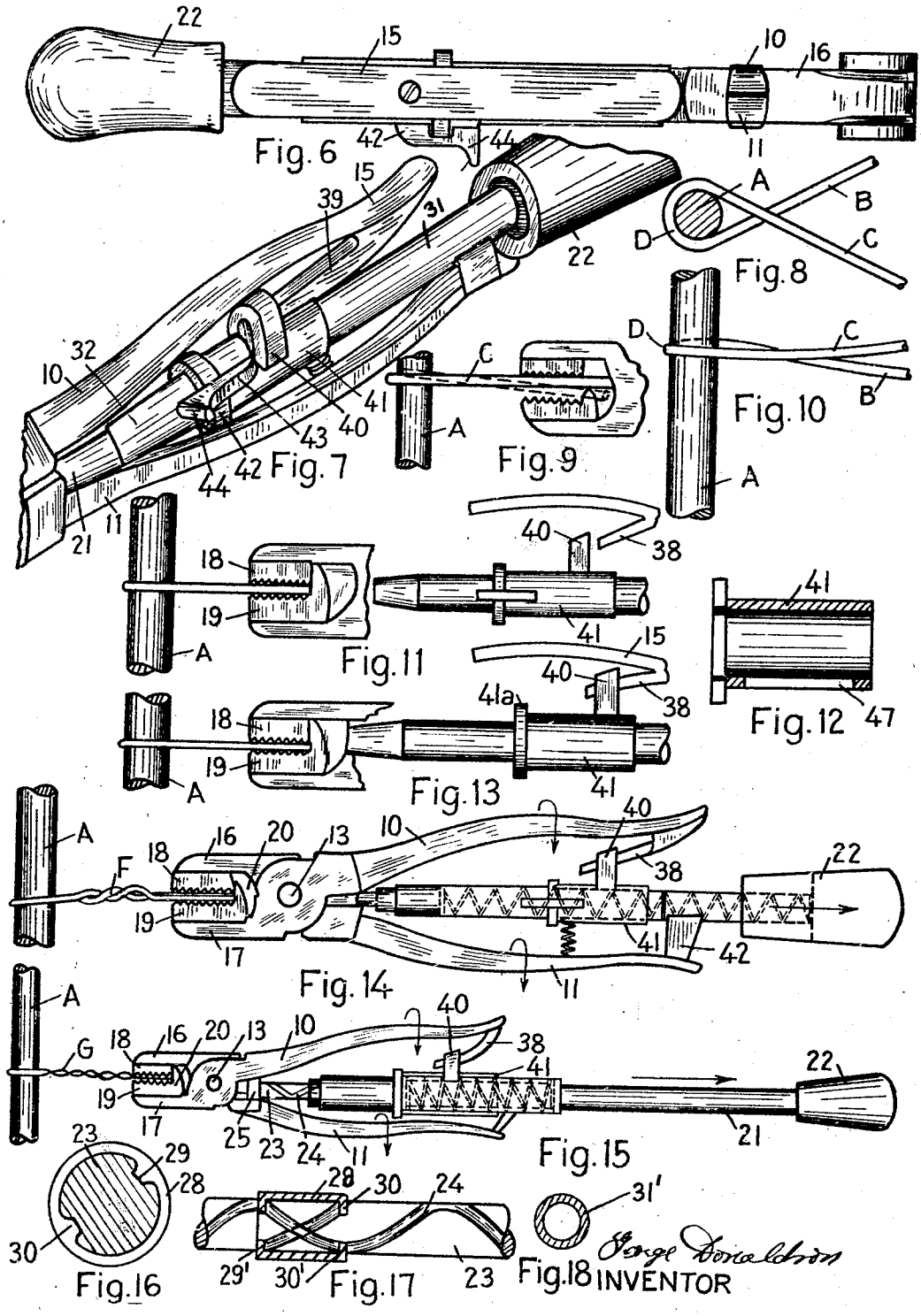
Fig. 2

George Donaldson
INVENTOR

Dec. 17, 1929. G. DONALDSON 1,740,392

COMBINATION PLIERS AND WIRE TWISTING TOOL

Filed Nov. 14, 1927 2 Sheets-Sheet 2



Patented Dec. 17, 1929 1,740,392

UNITED STATES PATENT OFFICE

GEORGE DONALDSON, OF LOS ANGELES, CALIFORNIA

COMBINATION PLIERS AND WIRE-TWISTING TOOL

Application filed November 14, 1927. Serial No. 233,157.

This invention relates to improvements in tools and more particularly to clamping tools such as pliers and has for its object to provide a combination tool adapting a pair of pliers to service in connection with wire tying operations.

One of the objects of my invention is to provide a simple, effiecient and inexpensive device of this character rendered serviceable instantly by the operator for work calling for twisting the end of a length of wire upon itself for wire tying purposes.

Another object of my invention is to provide a pair of pliers with associated means capable at will of effecting the spinning around of the pliers, as the latter hold the ends of the wire to be intertwisted together, said means forming an extension of the pliers proper.

A still further object of my invention is to provide a pair of pliers with clamping as well as with cutting jaws, so that wire can readily be cut whenever desired, the use of the pliers for all practicable purposes being independent of the use of the adjunct thereto for wire handling purposes.

Another object of my invention is to provide means for latching the movable jaws of the tool for the purpose of assuring that the wire be rigidly clamped between the jaws of the pliers as the latter are spun around by means of the spinning means provided in conjunction with the tool.

A further object of my invention is to provide means for imparting rotation to the pliers when the latter clamps a wire terminal or terminals, and is held against accidental rotation by the terminals, the latter being fixed or fastened in position, as the pliers are designed to be rotated; and at the same time to provide for allowing the pliers spinning device to itself revolve in order to be restored to initial position to get a fresh start in again revolving the tool.

In carrying out the purposes of my invention I design to provide a simple improvement capable of being added as an attachment to any make of clamping and cutting pliers and effective to furnish manual power for twisting the pliers when the same is clamping wire terminals or the like.

With the above and other objects in view, my invention consists of the combination, arrangement and details of construction disclosed in the drawings and specification, and then more particularly pointed out in the appended claims.

In the drawings, wherein similar reference characters designate similar parts throughout the respective views,

Figure 1 is a side view, partly in longitudinal section, of the parts of my invention,

Figure 2 is a front end elevation of my invention,

Figure 3 is another end elevation of my invention showing the jaws in open position,

Figure 4 is an end elevation like Figure 3 but showing the jaws in closed position,

Figure 5 is a fragmental detail perspective view of the front portion of my invention,

Figure 6 is a top plan view of my invention.

Figure 7 is a fragmental perspective view of the rear portion of my invention,

Figure 8 is a cross sectional view of a post around which are shown twisted opposing portions of the wire to be intertwisted.

Figure 9 is a fragmental diagrammatic view showing how the wire ends are clamped between the jaws of my invention,

Figure 10 is a fragmental side view of a post showing the wire terminals coiled thereabout,

Figure 11 is a fragmental side elevation showing diagrammatically how the wire held between the jaws of the pliers are cut,

Figure 12 is a sectional side view of a sleeve member about to be described,

Figure 13 is a view similar to Figure 11 but showing the manner in which the jaws of the pliers are latched closed,

Figure 14 is a side elevation of my invention shown applied to a wire secured about a fixed post, the pliers having been partly spun around to twist the wire terminals.

Figure 15 is a view similar to Figure 14 showing the parts in extended position and the wire completely twisted.

Figure 16 is a cross sectional view of the worm with the worm wheel engaged thereupon.

Figure 17 is a fragmental side elevation of

the worm showing the worm wheel engaged thereupon, in section, and

Figure 18 is a sectional cross section thru a collar about to be described.

There are many cases where it is found desirable to connect or to tie the terminals or ends of wire together, as in providing the wire mesh support for stucco walls, or in tying wire to fence posts and in many other situations. Ordinarily pliers are used to twist the wire ends but this cannot be effected without due skill being devoted on the part of the operator, and uniformly satisfactory results cannot be obtained, nor can the work be done with despatch. Pliers are needed to cut the wire ends and for effecting the twisting of the wire terminals, but in order to assure accuracy of accomplishment, uniformity of results, and rapidity of operation it is desirable to provide means on the pliers for effecting the twisting of the terminals of the wire, whilst stretching the wire itself. This is accomplished by means of the instrumentalities about to be described.

My invention is in the form of an ordinary attachment that can be secured upon any desirable form of pliers. The pliers will have the pair of crossed arms 10 and 11 with an intervening slit therebetween designated 12, the pin 13 being secured to both arms 10 and 11 in the usual manner; the free ends of the arms 10 and 11 are formed with arcuate-shaped lips 16 and 17 respectively; bearing portions 14 and 14′ are also provided upon the arms 10 and 11 for strengthening the arms where they are pivoted by the pin 13. The arms 10 and 11 terminate in the pliers handles 15, 15′ of approved construction. A serrated jaw 18 is formed or mounted upon the lip 16, while another serrated jaw 19 is mounted upon the lip 17, this jaw being formed with an integral rear knife edge 20 designed to engage the rear edge of the jaw 18 there being a space immediately in back of both jaws. The serrations on the jaws are designated 20^a.

There is provided a slidable tube which is arranged longitudinally beginning at a point in the crotch of the pliers; a suitably shaped handle 22 is provided with a bore 27 and into this bore the tube 21 extends concentrically and is caused to embrace the sleeve 35 held with a pressed fit in the counterbore of the handle and to be retained in position by means of the socket piece 36 snugly received into this tube 21 the socket piece having the integral flange countersunk into the handle and being provided with the screw groove 37, as shown in Figure 1. At the inner end of this tube 21 is rigidly secured a worm wheel 28 having the oppositely disposed convolute or spiral tangs 29, 30, 29′, 30′ designed to mesh and engage in the spiral groove 24 that extends longitudinally of a screw or worm 23, this worm rod 23 being rigidly secured at one end to one of the arms of the pliers, and the innermost end of this screw rod being located in the crotch of the pliers; this worm may be hollow or not as may desired.

The tube 21 and worm rod 23 are encased in a longitudinally extending tubular casing 31 fixed in position by means of the block 42 securing this casing upon the handle 15′ of the tool. The worm wheel 28 is thus guided for rectilinear movement in this casing 31. Coiled around the slidable tube 21, and engaging snugly in the fixed casing 31, is a longitudinally extending spring 32 which bears at one end against the collar 31′ secured so as to close the front end of the casing 31, to confine the spring 32 at this end. The spring bears at its opposite end in the same casing 31, but bears against the sleeve 35 in the handle 22. The spring occupies the annular space 33 extending between the tube 21 and casing 31.

Formed or mounted upon the handle 15 of the pliers is the projection 38 carrying the tapering finger 39 which extends in the direction of and alongside the handle 15 towards the crotch of the tool or pliers. There is a sleeve 41 designed to slidably engage upon the casing 31 for a short distance, and it carries upon its surface a loop member 40 whose inner edge, where engaged by the tapering finger 39, may be beveled. This sleeve 41 is formed with a rectilinear slot 47 thru and into which will extend the pin 46 tapped into the handle 15′, and around this pin 46 is coiled a spring 45 exerting a tension and pressure against the sleeve 41, while the pin limits the sliding range of this same sleeve. The screw pin 26 is tapped thru handle 22 into both the sleeve 35 and tube 21 thus holding these parts firmly together. It will be noticed that the slidable tube 21 has a slidable bearing in such a manner that at one end it is received upon the fixed sleeve 35 and at its opposite end the worm wheel 28 has a slidable bearing in the casing 31.

In operation when it is desired to use the pliers proper it will be seen that the tapering finger is disengaged from the loop member 40, by sliding sleeve 41 in the proper direction for this purpose. This having been done the pliers handles 15, 15′ may then readily be opened and closed as with usual pliers. Suppose it is desired to twist the terminals of the wire together, whilst the latter is brought back upon the fixed post or support A, Figure 8. The portion of the wire returned upon itself is designated D, the terminals are designated B and C, and these terminals will be clamped between the jaws 18 and 19 of the pliers, as shown in Figure 9, the terminals being preferably arranged inwardly of the knife edge 20. When next the pliers handles are closed these terminals of the pliers are severed, as shown in Figure 11 by the cutting edge 20 of the jaw 19 of the pliers. There is provided for actuating

the sleeve 41 a shank 43, terminating in a rightangular laterally projecting finger rest 44. By engaging the finger rest 44 the operator is enabled to slide the sleeve 41 to cause its looped portion 40 to engage the finger 39 of the pliers; thereupon the handles 15, 15′ of the pliers are held in closed relation, resulting in the wire terminals also being clamped between the jaws 18, 19 of the tool.

The pliers are now ready to be twisted. The operator now grasps hold of the handle 22 firmly in his hand, and exerts a longitudinal pull upon the tool, to stretch the wire terminals having a bearing upon the post A; the handle 22 is then pulled out relatively to the fixed pliers, which cannot be pulled further so the slidable tube 21 begins to slide rectilinearly out of casing 31 to the rear thereof, causing the worm wheel 28 to have its tangs 29, 29′, and 30, 30′ to trace the spiral grooves of the worm rod 23, and thereupon the worm begins to turn and the pliers being secured to this worm rod, begins to spin around, carrying the terminals of the wire along with it, so the wires B and C are intertwisted together producing the section F shown in Figure 14. As this is taking place, of course the handle 22 is not rotating being held firmly in the hand of the operator. The operator now continues holding the pliers to stretch the wires, but allows the spring, (which has been elongated and stretched and tensioned upon the pulling out of the slidable tube 21) to relax and to pull the handle 22 back to normal position, which will restore the worm wheel 28 back to normal position at the inner end of casing 31. The operator continues holding the pliers, and as the worm wheel moves to normal initial position at the inner end of the casing 31, the tangs thereof will trace the spiral grooves of the worm, and the worm will turn the worm wheel and the slidable tube, and the handle 22 will turn with the slidable tube 21, so the operator need hold only the pliers, allowing the handle to turn and be automatically restored to normal position. Of course as this takes place the pliers are not turning, but now the operator, having obtained a fresh hold of the tool, again pulls the handle 22 outwardly and thereupon the pliers are again turned and the wires further intertwisted, and this operation may be repeated if necessary until the portions of the wires held between the jaws of the pliers break due to elastic limit having been reached, and the parts now assume the relationship shown in Figure 15. The work of twisting the wire terminals is done, and the section of twisted wire G is all that is left.

The operator will see fit to coil a long length of wire around his wrist, and play out from time to time the end thereof to be wound around a post or support, the ends of the wire returned upon itself, intertwisted as hereinbefore shown and again tied. It will thus be seen that a convenient handy tool has been provided effective for the purpose of tying wire terminals upon itself quickly, by the use of a tool instead of a machine, allowing both the pliers and pliers spinning tools to be used together or separately. I do not intend to limit myself to the exact details of construction disclosed herein but mean to cover all variations falling within the purview of the appended claims.

What I desire to protect and seek by Letters Patent is:—

1. A tool composed of a pair of pliers, a support for said pliers, a slidable member on the tool operating in said support, a handle carried by said slidable member, and means operated by said slidable member and designed to rotate the pliers independently of said handle.

2. A tool composed of a pair of pliers, a support therefor, a shank on said support, a tube slidable longitudinally upon said shank, a handle carried by said tube, a spring compressed as said tube slides, and means engaging said pliers and actuated by the slidable tube for the purpose of allowing independently rotative movement of the pliers relatively to said handle.

3. In combination a pair of pliers having handles for operating the same, a support connected to said pliers and extending between the handles of the latter, a worm carried by said support and rigidly connected to said pliers, a slidable means on said support having provision for engaging said worm so as to rotate the latter, and means for manually actuating said last named means.

4. In combination a pair of pliers having operating handles, a worm secured rigidly to said pliers for rotating the latter, a sleeve embracing said worm and having projections engaging said worm so as to rotate the latter, a support carrying said pliers in which said sleeve operates, a handle for operating said sleeve, and means holding said worm against rotation independently of the support.

5. In a device as described, the combination of a pair of pliers, pivotal handles carried by said pliers, a worm rod extending rearwardly from said pliers and connected to the latter, a sleeve surrounding said worm and having means projecting into the worm for the purpose of turning the latter, a casing fixedly secured to one handle, in which said worm rod and sleeve extends, a handle receiving one end of said casing, and a latch for holding said pliers closed.

6. A device as described consisting of an elongated tubular device, a handle having a counterbore formed therein, said tubular device being concentrically disposed against displacement in said handle, a worm wheel fixedly carried inside said tubular device at

one end, a worm rod with which said worm wheel engages, the worm projecting into said tubular device, a pair of pliers operatively associated with said worm, plier handles, means securing the tubular device rigidly to one of the plier handles, and a spring opposing the movement of the tubular device, as the latter is moved to cause its worm wheel to rotate the worm.

7. A tool of the character described consisting of a worm rod, a pair of pliers to which the rod is secured, a narrow worm wheel meshing with the worm rod adjacent the pliers, a longitudinally extending tube carrying said worm wheel, a casing embracing said tube, means rigidly connecting said casing to said pliers, and an actuating handle carried by said tube for the purpose of pulling the tube rectilinearly to revolve the worm rod and the pliers.

8. In a tool as described the combination of a pair of pliers having pivotal handles, means interposed between said handles for rotating said pliers as the means is moved rectilinearly, a handle connected to said means for actuating the latter, a loop carried by said means, means for shifting said loop longitudinally, and a tapering dog carried by one of the pliers handles for engagement with said loop for the purpose of locking the pliers against opening.

9. In a tool as described, plier sections, said plier sections being formed with interengageable serrated jaws opening and closing upon each other, one of said jaws being formed with a rightangular offset providing a knife edge designed to bear against the rear end of the other jaw.

10. In combination a pair of pliers having pivotal divergent handles, a longitudinally extending casing interposed between said handles and secured at its rear end to one handle, means slidably engaging said casing and connected to said pliers for rotating the pliers, a coiled spring guided for movement in a plane at right angles to said casing and exerting spring tension against the slidable means, and means effective when said pliers are closed, to engage said casing for the purpose of locking the pliers against opening.

In witness whereof he has hereunto set his hands this 24th day of October, 1927.

GEORGE DONALDSON.