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F. J. PRAY
SPEED PLIER MEANS

2,737,983

Filed June 29, 1953

2 Sheets-Sheet 1

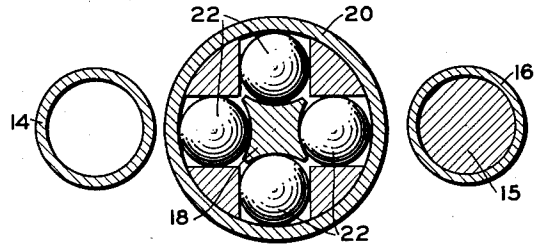
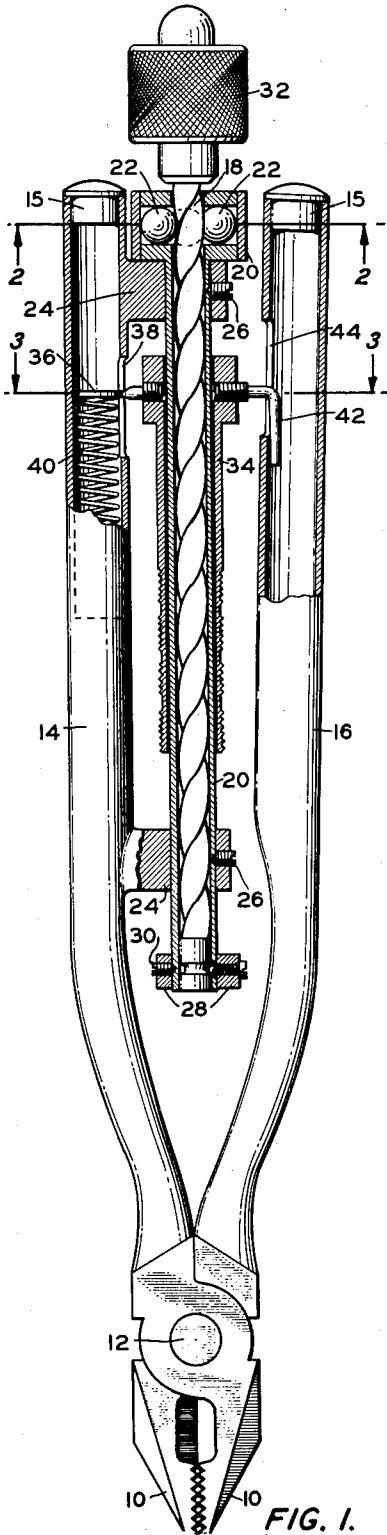


FIG. 2.

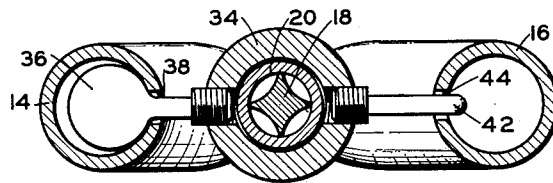


FIG. 3.

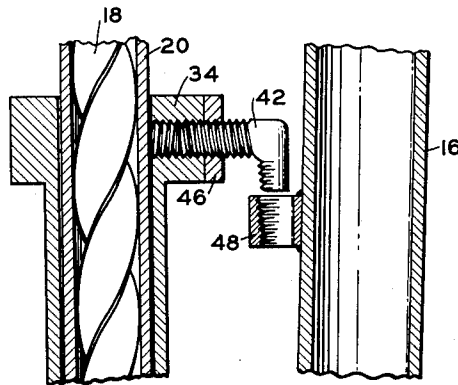


FIG. 4.

INVENTOR.
FRED J. PRAY

BY

John H. Widdowson
ATTORNEY

March 13, 1956

F. J. PRAY
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2 Sheets-Sheet 2

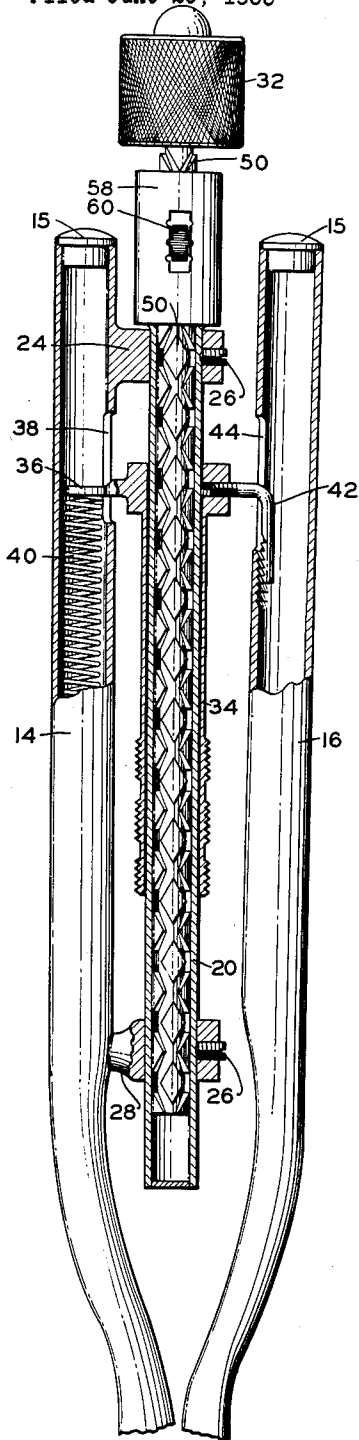


FIG. 5.

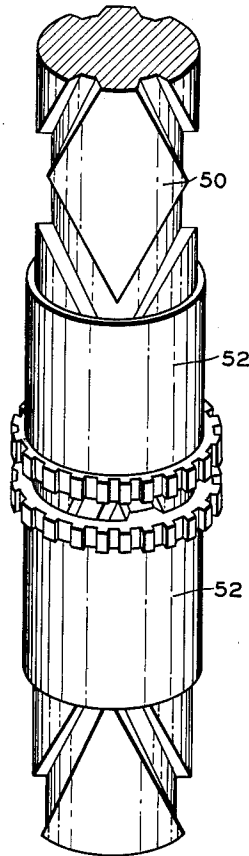


FIG. 6

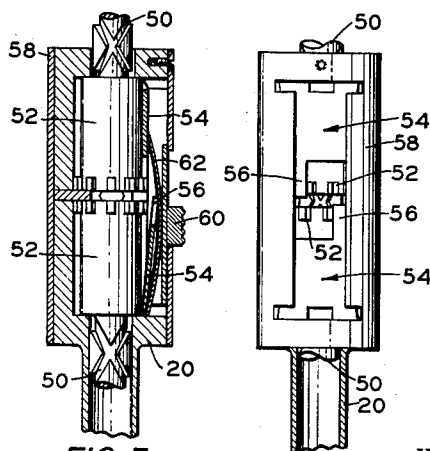


FIG. 7.

FIG. 8.

INVENTOR.
FRED J. PRAY

BY
John H. Willderson
ATTORNEY

1

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SPEED PLIER MEANS

Fred J. Pray, Wichita, Kans.

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1 Claim. (Cl. 140—118)

This invention relates to tools. In a more specific aspect, this invention relates to plier means. In a still more specific aspect, this invention relates to plier means particularly suited for rapidly and efficiently twisting the ends of wire together, such as is desirable in safety wiring to prevent the turning of a nut or a plurality of nuts.

Common plier and safety wire twisting means operated by turning mechanism are known in the art and used industrially. With such plier means, the wire twisting is slow and the twist is subject to being non-uniform from nut to nut depending on the skill of the mechanic, and the plier means with the turning mechanism known in the art is cumbersome and inefficient, requiring many operations to close the jaws of the plier on the ends of the wire and to turn the speed plier. In addition, such means as are known in the art require uncommon type plier jaws and are expensive to build and inefficient to use, offering little or no improvement over the common hand pliers.

I have invented plier means which can be incorporated in and with the common known types of pliers, the resulting combination allowing for speedy and efficient twisting of wire ends. My new plier means is particularly valuable when used for twisting the wire ends of safety wiring to prevent the turning of nuts. The new pliers of my invention comprise a plier with one of the handles of same mounting a turning shaft which is adapted to rotate the plier by action of the mechanic or operator. The new plier means of my invention has means therewith to lock the plier in a closed position, and has spring means therewith to urge the locking means to an unlocked position. I have found my new plier to be very efficient, allowing for rapid twisting of wire ends of safety wiring. The lock means of the plier of my invention desirably utilizes tension of the handles of my plier to lock same in a closed position, spring means being incorporated to urge the plier to an unlocked position when plier handle tension on the lock means has been counteracted by pressure applied by the operator. The locking means of my speed plier, allowing for the rapid locking of the plier in position with the jaws on the wire ends and allowing for rapid release of the plier jaws from the wire ends after they have been twisted, has been found to be extremely advantageous. The safety wiring of nuts can be speeded up considerably by use of my new plier means.

It is an object of this invention to provide new tools.

It is another object of this invention to provide new plier means.

It is still another object of this invention to provide new plier means with mechanism therewith to provide for rotation of the plier so that an operator can more rapidly turn the plier, such being particularly desirable when used to twist the ends of safety wire.

Still another object of this invention is to provide new plier means having mechanism therewith to turn same mechanically, such means being easily and quickly mounted for operation on the ends of wire to twist same

2

and easily and quickly released from such wire ends after twisting has occurred.

Other objects and advantages of the new plier means of my invention will become apparent to one skilled in the art upon reading this disclosure.

Drawings accompany and are a part of this disclosure. Such drawings depict preferred specific embodiments of the new plier means of my invention, and it is to be understood that such drawings are not to unduly limit the scope of my invention.

Fig. 1 of the drawings is a longitudinal view, partly in cross section, of a preferred specific embodiment of the speed plier means of my invention.

Fig. 2 is a view taken on lines 2—2 of Fig. 1.

Fig. 3 is a view taken on lines 3—3 of Fig. 1.

Fig. 4 is a longitudinal cross sectional view of a portion of the new plier means of my invention having the means to lock the plier in a closed position and showing a preferred specific embodiment of the locking means of my invention.

Fig. 5 is a longitudinal view partly in cross section showing a preferred embodiment of the speed plier means of my invention particularly adapted for clockwise or counterclockwise rotation of the plier means in operation.

Fig. 6 is a perspective view showing preferred ratchet means incorporated in the plier means shown in Fig. 5 allowing for such clockwise or counterclockwise rotation.

Fig. 7 is a cross sectional longitudinal view of the ratchet means of Fig. 6 mounted in operative position in the housing which in turn is mounted on the plier, as shown in Fig. 5.

Fig. 8 is a longitudinal view partly in cross section showing dog means mounted in operative position with the ratchet means shown in Figs. 6 and 7, such dog means cooperating with the ratchet means to allow for such clockwise and counterclockwise rotation, the assembly being that shown housed in Fig. 5.

Following is a discussion and description of preferred specific embodiments of the new speed pliers of my invention. In such discussion and description, reference is made to the drawings whereon the same reference numerals are used to depict the same or similar structure or assembly. It is to be understood that the following discussion and description is not to unduly limit the scope of my invention.

The speed plier means of my invention has jaw members 10 and a pair of handles preferably integral therewith and pivoted by a pin means 12. Handle 14 mounts turning mechanism, and handle 16 has eye means therewith to receive hook means, which is used to lock the plier in a closed position. The outer end portions of handles 14 and 16 are preferably hollow, plugs 15 sealing the handles at the very outer ends, for which other suitable means can be used, if desired. It has been found that tubular material of a suitable metal can be welded or otherwise suitably fastened to the handles of a common type plier, if desired. As will be seen from the discussion and description set forth hereinafter, plier handle 16 can be a solid member. However, with the outer end portion of handle member 16 being hollow, it is convenient to provide therewith simple, inexpensive and efficient eye means for locking the plier in operative position.

Turning mechanism, having a spiral turning shaft 18, is mounted in a sleeve 20 having ball bearings 22 mounted in the upper end portion, spiral shaft 18 fitting, as shown, between ball bearings 22 and in sleeve 20. Sleeve 20 is mounted on handle member 14 by holding members 24 which can conveniently be welded to handle 14, or be attached in other suitable manner, or be made integral therewith. Set screws 26 are used to retain sleeve 20 and the turning mechanism in members 24. On the

lower end portion of sleeve 20 is mounted removable holding means having ring member 28 housing a so-called Allen type ball and spring snap lock and having a set screw 30 to hold the assembly on the lower end portion of sleeve 20. The ball of the Allen type fastener fits into a groove in the inner end portion of spiral turning shaft 18 to hold the shaft in such position against ordinary jars and jolts and against sliding out of sleeve 20 when the handles of the plier are held downwardly. The spiral shaft is released from such stationary position by slight outward pressure exerted by pulling on grip 32 which is attached to the outer end portion of shaft 18. Shaft 18 released from the Allen type snap fastener means is in position for operation of the speed plier, and when not in use, pressure exerted to force shaft 18 inwardly resets the ball in the groove in the inner end of shaft 18.

A collar or outer sleeve member 34 is slidably mounted on inner sleeve 20 between holding members 24. Sleeve 34 has an arm member 36 suitably attached thereto, such as by threaded attachment, as shown in Figs. 1 and 3, or integral therewith as shown in Fig. 5. Arm member 36 fits into the hollow space in handle 14 through slot 38 and is preferably flat as shown to provide a surface against which the pressure of spiral spring 40 can be exerted to force arm member 36 outwardly and in turn member 34. Hook means 42 is attached to sleeve member 34 in any suitable manner, such as by threaded attachment as shown, and cooperates with eye means to lock the plier in a closed position with spring 40 in compression and exerting force to move member 34 outwardly. I have found that the eye means can conveniently be formed by a slot 44 in handle member 16 through which hook member 42 fits, the hook contacting the inner wall of hollow handle 16. Hook member 42 is so positioned that spring tension exerted outwardly by handles 14 and 16 holds hook 42 in locked position against the force exerted by spiral spring 40. The hook 42 is then automatically released when the handles are squeezed together by hand pressure which releases the force exerted by the handles on hook 42. If desired, as shown in Fig. 5, hook member 42 and the inner wall of handle 16 can have interlocking grooves at point of contact to better provide for locking against the force of spring 40.

In Fig. 4 is shown a desirable modification of the locking means wherein hook member 42 is threadedly attached to sleeve member 34, and adjustably so with fine threads preferably being used, hook member 42 being firmly held in a desired position by lock nut 46 threadedly mounted thereon. An eye member 48 is suitably attached to handle member 16, such as by welding, hook member 42 fitting therein. The contacting surfaces of hook member 42 and eye 48 preferably have interlocking grooves therein to better maintain the hooked position. Such a modification, as shown in Fig. 4, is particularly desirable to allow for an adjustment of pressure of jaws 10 of the plier when in locked position. With hook member 42 relatively extended from member 34, less pressure will be exerted by jaws 10 when the plier is in locked position.

In the embodiment of my speed plier shown in Figs. 5, 6, 7 and 8, a spiral turning shaft 50 is employed which allows for clockwise or counterclockwise rotation of the speed plier of my invention upon extension of the spiral turning shaft, rotation on extension of the turning shaft being found desirable in operation to twist the ends of safety wire together. The spiral turning shaft 50 is of the so-called Yankee type and the ratchet and dog operating means for same is housed in the upper end portion of sleeve 20. The Yankee type ratchet means 52 is mounted around spiraled shaft 50, and dog means 54, having extension portions 56 which interlock with the splines of the ratchet means 52, are mounted in operative position to the ratchet means 52. The whole has

shield 58 therearound. Button 60 attached to leaf spring means 62 is used in a usual manner to adjust the turning mechanism so as to provide for (1) rotation of the plier in a clockwise direction upon extending shaft 50, or (2) rotation in a counterclockwise direction upon extension of shaft 50, or (3) locking the turning assembly against extension of shaft 50 by placing button 60 and spring means 62 in neutral position as shown in Fig. 5. In this latter position, both the extension arms 56 of dogs 54 are interlocked with the splines of ratchet means 52.

In using the speed plier means of my invention, the wire ends to be twisted together are placed between jaws 10, preferably substantially parallel to each other and to the plier handles 14 and 16. The plier is held in one hand and the handles are squeezed together to clamp the wire ends between jaws 10. With the other hand, collar or sleeve 34 is moved inwardly over sleeve 20 until hook 42 is in contact with its eye means over a substantial portion of its length. At this time, hand pressure is removed from handles 14 and 16 and they exert pressure in an outward direction to hold hook 42 in position in the eye means. Collar or sleeve 34 can then be released. The spiral turning shaft is extended by grasping grip 32 and pulling outwardly. The plier rotates as the spiral turning shaft is extended, twisting the wire ends together. To release the plier from the twisted wire ends, handles 14 and 16 are grasped and squeezed together. Force exerted by the plier handles to hold hook 42 in locked position is counteracted and spiral spring 40 which is in compression in such locked position exerts force on arm member 36 to move collar or sleeve 34 outwardly and in turn release hook 42 from the eye means. When release of hook 42 has occurred, the plier handles 14 and 16 can be moved apart thus moving jaws 10 apart and releasing the wire ends. As one skilled in the art can readily see, the twisting of wire ends such as is desirable in safety wiring is easily, efficiently and very rapidly accomplished with the plier means of my invention, and the plier tool is easy and economical to construct.

As will be evident to those skilled in the art, various modifications of my invention can be made, or followed, in the light of this disclosure and discussion, without departing from the spirit or scope of the disclosure or from the scope of the claim.

I claim:

A speed plier comprising, in combination, a plier having one of its handles hollow in an outer end portion thereof, an inner sleeve removably mounted in holding means attached to said plier handle having a hollow portion, ratchet means mounted in said inner sleeve in an outer portion thereof, said ratchet means adapted to allow for right-handed, left-handed and no turning of said plier upon operation, an outer sleeve slidably mounted on said inner sleeve, an arm member attached to said outer sleeve, said arm member projecting into said hollow portion in said plier handle, having a flattened outer end portion for contacting an end of a spiral spring and said arm member adapted to move longitudinally in relation to said plier handle, a spiral spring mounted in said hollow portion of said plier handle in contact with said flattened end portion of said arm member and said spiral spring adapted to urge said arm member and said outer sleeve outwardly, a hook member threadedly and adjustably mounted on said outer sleeve opposite said arm member, an eye member mounted on the outside of the other of said plier handles, said hook member and eye member adapted to engage when said plier is in closed position and hold the jaws of said plier tightly closed with said hook member held with spring tension of said plier handles and with said spiral spring in compression, said hook member and said eye member having grooves adapted to interlock when said plier is in closed position, a spiral turning shaft having spiral grooves therein for left and right-handed turning mounted in said ratchet means

5

and in said inner sleeve, said spiral shaft along with said ratchet means adapted to rotate said plier clockwise or counterclockwise upon extension, and a grip attached to the outer end portion of said spiral turning shaft adapted to be held by an operator to exert force to extend and retract said shaft.

5

6

References Cited in the file of this patent

UNITED STATES PATENTS

1,181,654	Eifel -----	May 2, 1916
1,401,817	Roberts -----	Dec. 27, 1921
1,563,178	Fegley et al. -----	Nov. 24, 1925
1,740,392	Donaldson -----	Dec. 17, 1929
2,394,807	Robinson -----	Feb. 12, 1946
2,670,015	Reynolds -----	Feb. 23, 1954