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J. E. SWANSTROM ET AL
SPRING LOADED PLIER TYPE TOOL

2,818,758

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FIG. 1

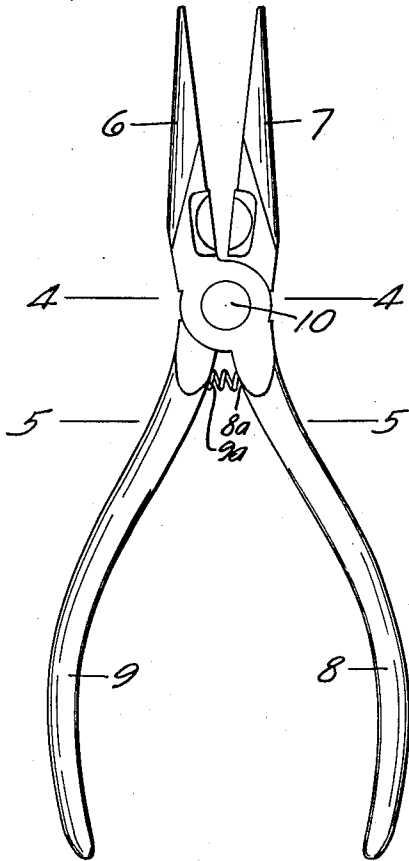


FIG. 2

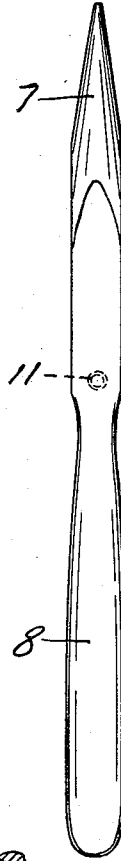


FIG. 3

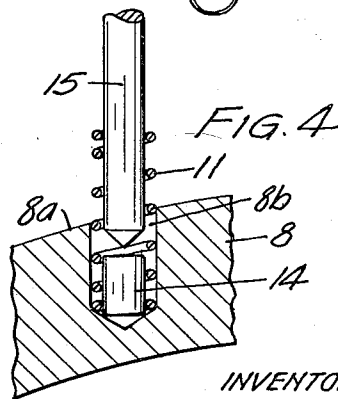
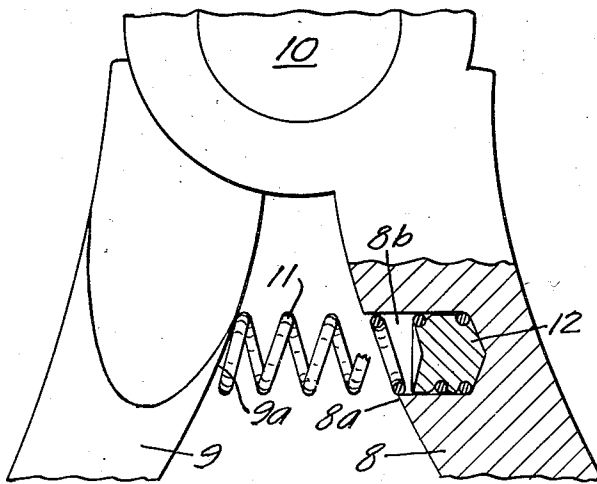


FIG. 4

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SPRING LOADED PLIER TYPE TOOL

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1 Claim. (Cl. 81—417)

This invention relates to tools. More particularly it relates to plier type tools of the type wherein it is desirable for the jaws of the tool to be constantly urged toward open position such as in long nosed pliers used by radio technicians.

In certain types of tools, it is desirable to have the jaw members constantly urged toward open position. This has been done generally in the past through the use of leaf springs connected to one of the jaw members and extending longitudinally thereof and across to engaging position with the other and sliding along the inner surface of the same when the jaws are moved toward closed position. This type of construction has a number of disadvantages. One of these disadvantages is that the leaf spring is constantly in the way of the fingers of the technician when the tool is gripped by him in working on small posts, wires and the like. Any interference, however slight, will cause the user to lose his grip of a small post or the like and this results in irritation, inconvenience and loss of time. In addition, this type of construction is relatively expensive to manufacture and assemble. Its structure is inefficient from a manufacturer's viewpoint for it requires a relatively large amount of metal to provide the needed resiliency.

It is a general object of our invention to provide a novel and improved spring-loaded handle type tool of the plier class which is of simple and inexpensive construction and assembly.

Another object is to provide a novel and improved spring-loaded handle type tool of simple and inexpensive construction and improved operation.

Another object is to provide a novel and improved method of securing and installing a spiral compression spring between the handle members of a plier type tool.

Another object is to provide a novel and improved spring-loaded handle type tool which can be assembled at a substantial reduction in cost as compared to similar tools as heretofore known.

These and other objects and advantages of my invention will more fully appear from the following description made in connection with the accompanying drawings, wherein like reference characters refer to the same or similar parts throughout the several views, and in which:

Fig. 1 is a side elevational view of one embodiment of our invention shown in open position.

Fig. 2 is an edge elevational view of the same.

Fig. 3 is a side elevational view of the area between lines 4—4 and 5—5 of Fig. 1, shown on an enlarged scale and with a portion thereof broken away to show the construction thereof.

Fig. 4 is a diagrammatic sectional view showing the operation whereby the spring and anchor plug are installed.

One embodiment of our invention, as shown in Figs. 1—3, may include a pair of opposed jaw members 6 and 7, each of which has a rearwardly extending handle element 8 and 9 respectively. As shown, these handle ele-

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ments extend in crossed relation so that when the handle elements are moved toward each other the jaw members 6 and 7 move toward closed position. When they are swung away from each other the jaw members 6 and 7 move away from each other toward open position as shown in Fig. 1. The jaw members 6 and 7 are pivotally connected at their point of crossing by a pivot means or post 10. The construction, as heretofore described, is well known in the prior art.

Immediately rearwardly and adjacent to the pivot means 10, the handle elements 8 and 9 have opposed substantially parallel surfaces 8a and 9a respectively. In one of the handle elements 8 and in its surface 8a there is formed a small cylindrical recess 8b. As best shown in Fig. 3, this recess extends substantially normal to the surface 8a. Mounted within the recess 8b and extending outwardly therefrom toward the other handle element 9 is a spiral compression type spring 11. This spring has an external diameter substantially equal to the diameter of the recess 8b. As best shown in Fig. 3, one end of the spring is positively secured to the handle member 8 in its recess 8b and the other end portion of the spring 11 bears against the surface 9a of the handle element 9. It will be noted that the spring member 11 extends substantially normal to the surface 9a.

The spring 11 is fixedly secured to the handle element 8 through the use of a soft metal anchor plug 12. This plug is preferably made of copper or a brass alloy. The spring 11 also can be secured by adhesives or by hot or cold soldering. Reference to Fig. 3 shows that the plug extends outwardly between the convolutions of the spring 11 and fixedly secures the spring to the walls of the recess 8b so that the spring cannot be separated from the handle member 8.

The spring 11 is secured to the handle member 8 in a novel manner. After the recess 8b has been formed in the handle member 8 the spring 11 is dropped into the recess so that one end portion thereof bears against the bottom of the recess. A soft metal plug such as 14 is then dropped downwardly through the interior of the spring 11 so that it rests on the bottom of the recess 8. This soft metal plug as previously mentioned, is preferably made of copper or a brass alloy and has an external diameter substantially equal to the internal diameter of the spring 11. To secure the spring to the side walls of the recess 8b, a tool having a conically shaped end such as the tool 15 is applied to the central portion of the plug 14 and the tool is then struck a sharp blow. The striking blow of the tool 15 at the central portion of the plug 14 causes the metal to flow into and to engage the convolutions of the spring 11 to form an anchoring plug such as 12. It will be noted that the material of the plug 14 is forced outwardly by the striking blow so as to extend into the area between the convolutions of the spring 11 to fixedly secure the spring to the handle element 8.

It will be readily appreciated that in use the spring member 11 constantly urges the handle element 9 toward the open position shown in Fig. 1. The free end of the springs bears against the surface 9a and urges the handle element 9 outwardly. It will also be readily appreciated that one of the principal advantages of this construction is that the spring member 11 is in a completely out-of-the-way position and thus does not interfere with the activities of the technician when he uses the plier.

Another advantage of our invention is that the spring member 11 is much simpler and easier to install than the leaf type spring commonly known and used. In addition, there is a substantial reduction in cost in the manufacture of a plier of this type. The material required for the manufacture of this tool is only a fraction of that required by methods heretofore known when a leaf spring was utilized.

In addition to the above it will be noted that the compression type spring member 11 provides a wider opening of the jaw members than would otherwise be provided in a similar pair of pliers by a leaf type spring. If a leaf type spring were provided in such a pair of pliers of sufficient strength to open the jaws as wide as the compression type spring 11 opens them, the spring member would be too strong for comfortable use by the technician when the jaws approached closed position. In other words, a leaf type spring of sufficient strength to open the jaws as far as the compression type spring opens them would be so strong as to be unduly tiring for the technician in his work.

Another advantage of our pliers is that the spring member 11 is attached to only one of the jaw members but it abuts against the parallel surface on the opposite handle member. Since the spring is attached to only one of the handle elements this avoids stretching of the spring member 11 if the handle elements are opened to an unusually wide open position and thereby damage the spring member.

Still another advantage of our pliers is that the coil spring 11 as so positioned permits the handle members to be more completely and efficiently insulated through the use of plastic or rubber sleeves thereon or through dipping the handle members in a quick drying insulating liquid. Such insulating coverings do not interfere with the spring action of the coiled spring 11. In contrast, such plastic or rubber coatings interfere considerably with leaf type springs as heretofore used and thus the efficiency and usefulness of the tool is impaired.

It will, of course, be understood that various changes may be made in the form, details, arrangement and properties of the various parts without departing from the scope of my invention.

What is claimed is:

A tool comprising a pair of opposed jaw members each having handle elements extending rearwardly therefrom in crossed relation, means pivotally connecting said handle elements at their point of crossing for movement toward and away from each other about a transverse axis, the handle elements of said jaw members having opposed substantially parallel surfaces facing each other immediately rearwardly of and adjacent to said pivot means, one of said handle elements having a cylindrical recess extending inwardly of its stated surface at substantially right angles thereto, a compression type spiral spring having one end portion disposed within said recess, the outer diameter of said spring being substantially equal to the inside diameter of said recess, and a soft metal anchor plug disposed within said one end portion of the compression spring and bottomed within said recess, the major portion of said plug being disposed within the confines of said spring and portions of said plug being deformed to extend outwardly between the convolutions of said spring to embrace the same and to tightly engage with the inner surface of said recess to fixedly secure said spring to said handle element, the opposite end of said spring extending outwardly from said recess for engagement with the opposed surface of the other handle member to normally maintain said jaw members in open position.

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