United States Patent [19]

Ferguson

[11] **3,869,793**

[45] **Mar. 11, 1975**

[54] **LATCH FOR HAND TOOL**

[75] Inventor: **William C. Ferguson,** Denville, N.J.

[73] Assignee: **J. Wiss & Sons Co.,** Newark, N.J.

[22] Filed: **Feb. 19, 1974**

[21] Appl. No.: **443,733**

[52] **U.S. Cl.** **30/262,** 81/331

[51] **Int. Cl.** **B26b 13/16**

[58] **Field of Search** 30/262, 261, 341; 81/331, 81/332; 29/221

[56] **References Cited**

UNITED STATES PATENTS

1,426,214	8/1922	Rausse	30/262
1,814,113	7/1931	Bernard	30/262

FOREIGN PATENTS OR APPLICATIONS

802,511	6/1936	France	30/262

Primary Examiner—Al Lawrence Smith
Assistant Examiner—J. C. Peters

[57] **ABSTRACT**

A hand tool, of the spring-opened type, having a pair of opposed working elements each carried by a handle, the working elements being pivotally connected to each other, is provided with a plastic tab on one of the handles and a hook on the other handle, whereby upon engagement of the tab with the hook the tool is in the closed position, and upon disengagement of the tab from the hook the elastic memory of the plastic tab urges the tab away from the hook to prevent inadvertent latching of the tab and hook during use of the tool. The tab and hook are preferably so designed that the spring force urging the handles apart tends to firmly seat the tab in the hook.

8 Claims, 7 Drawing Figures

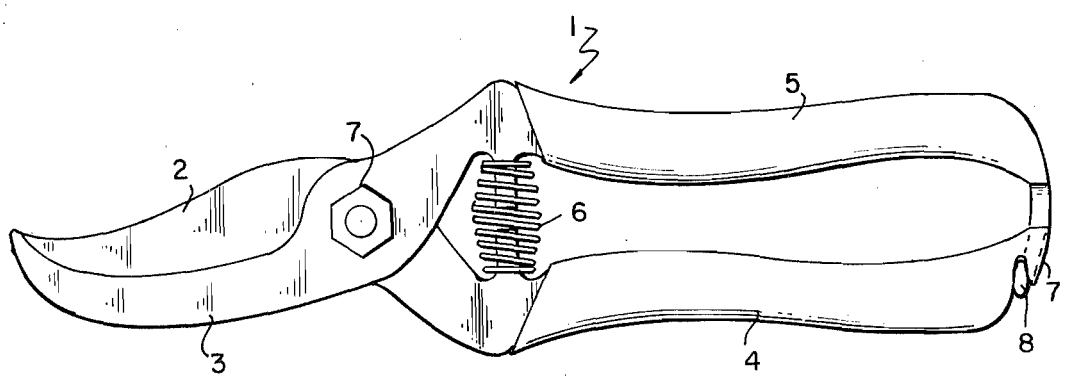


FIG. 1

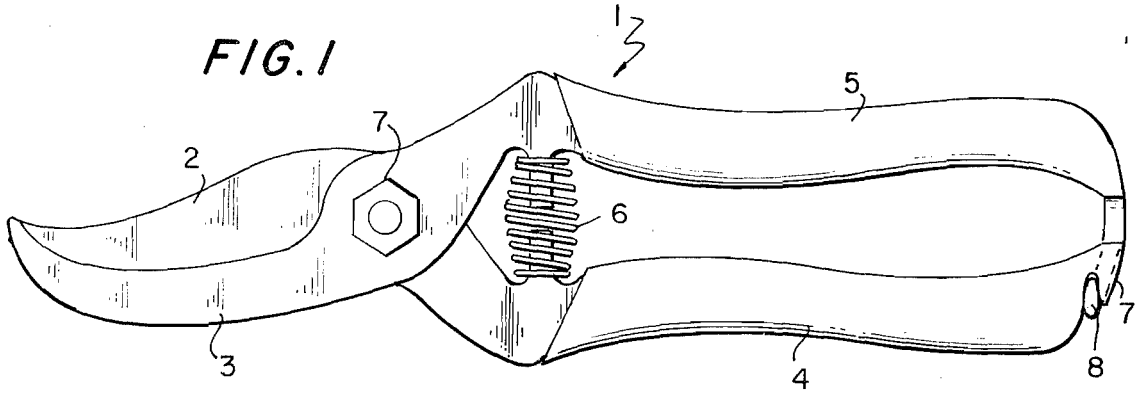


FIG. 2

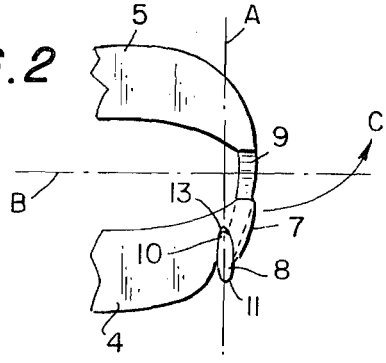


FIG. 3

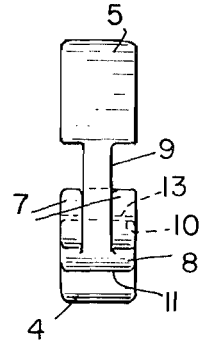


FIG. 4

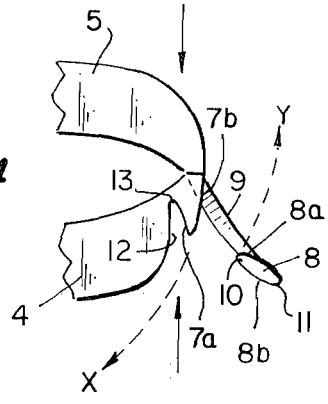


FIG. 5

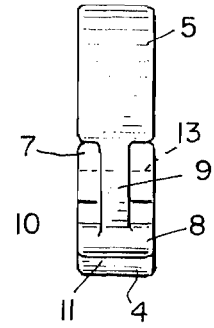


FIG. 6

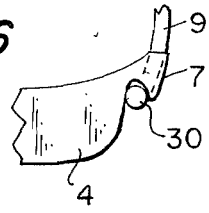
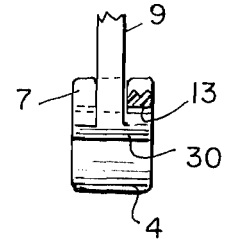


FIG. 7



LATCH FOR HAND TOOL

DETAILED DESCRIPTION OF THE INVENTION

The present invention relates generally to hand tools, and more particularly to hand tools such as scissors and shears, pruners and snips, in which the tool comprises a pair of handles, each carrying a working element, the handles or the working elements being pivotally connected together. Specifically, the present invention relates to an improvement in latch means for such tools.

Hand tools, such as scissors and shears, pruners and snips, have been provided with plastic handles, which were generally attached to the cutting blade or to a tang longitudinally extending from the cutting blade. To assist in the operation of the tool, it has been customary to provide a spring between the ends of the handles and the pivot means to urge the handles apart to the open position. Various devices have previously been provided for such spring-opened handles to keep the handles latched together in the closed position, but the prior art latch means suffer from the disadvantages of often interfering in the closing action of the handles after the latch means is unlatched, and/or of being formed separately from the formation of the handles, thereby requiring separate operations to form the latch means and to attach it to the handles.

The primary object of the present invention resides in the development and production of economic latch means for tools having spring-opened handles.

A further object of the present invention is to provide a latch means of simple construction and a minimum of parts.

A further object of the present invention is to provide a latch means which can be economically manufactured and yet provides sure and safe operation.

These objects are accomplished by the provision in the present invention of a spring-opened tool having a pair of handles, each handle carrying a working element, such as a cutting blade, with the handle-working element assemblies being pivotally connected to each other. The tool further includes a spring urging the handles apart to the open position.

The latch means of the present invention is provided by a tab integral with one of the handles and a hook formed in the other handle, the handle carrying the tab being molded in one operation from flexible plastics or rubber material, such as polyvinyl chloride, polyethylene, polypropylene, synthetic or natural rubber, or the like, which has a "memory". That is, the plastics material used to form the tab tends to move toward its "as molded" configuration when deformed away from this "as molded" position. Polyvinyl chloride is a preferred plastics material.

To take advantage of the elastic memory properties of these plastics materials, the handle and tab are molded in such a configuration that the tab is at an acute angle to the longitudinal axis of the handle. To latch the tool, the handles are moved together against the bias of the spring to close the device, and the tab is then forced away from its "as molded" position to increase the angle between the tab and the longitudinal axis of the handle, and the tab is caused to enter the hook. To unlatch the tool, the handles of the tool are squeezed together, whereupon the tab will slide out of the hook and the elastic memory of the plastic tab will urge the tab back to the "as molded" position, and away from the hook. Once the handles are unlatched, the tab will not interfere with the cutting operation or other operation of the tool.

Various further and more specific purposes, features and advantages will clearly appear from the detailed description given below, taken in connection with the accompanying drawings, which form part of the specification and illustrate merely by way of example embodiments of the device of the invention. The invention consists in the novel parts, construction arrangements, combinations and improvements as may be shown and described in connection with the latch herein disclosed by way of example only and as illustrative of preferred embodiments.

In the following description and in the claims, parts will be identified by specific names for convenience, but such names are intended to be as generic in their application in similar parts as the art will permit. Like reference characters denote like parts in the several figures of the drawings, in which:

FIG. **1** is a plan view of a cutting tool having the latch means of the present invention, with the cutting tool being shown in the closed or latched position;

FIG. **2** is a detail view of the handles and latch means of the tool shown in FIG. **1**;

FIG. **3** is a side elevational view of the handles and latch means shown in FIG. **2**;

FIG. **4** is a detail view showing the position of the latch means and hook after the handles have been squeezed together;

FIG. **5** is a side elevational view of the handles and latch means shown in FIG. **4**;

FIG. **6** is a detail view of a modification of the invention; and

FIG. **7** is a side elevational view of the embodiment of FIG. **6**.

FIGS. **1–5** illustrate a tool having the latch means of the present invention, and for purposes of illustration the spring-opened tool is shown as a cutting tool, such as a scissor or shear, pruner or snip. As stated above, the tool need not be a cutting tool, and can be, for example, a punch, marker, rivet assembler or any tool in which a pair of working elements is connected to a pair of handles, the working element-handle assemblies being pivotally connected to each other and spring-opened.

The cutting tool **1** is seen as having blades **2** and **3**, which are carried by handles **4** and **5**, respectively. The handles **4** and **5** are urged to the open position by means of spring **6** and are held in the closed position shown in FIGS. **1, 2** and **3**, by means of the engagement of hook **7** and tab **8**. The spring **6** urges tab **8** into the hook **7** with the cooperation of the cam surfaces **7***a* and **8***a* of the hook and tab, respectively. Once in the closed position, the tab **8** is so located in the aperture **12** of the hook **7** that the forces exerted by spring **6** urging the handles **4** and **5** apart will act along the axis A, which is preferably perpendicular to the longitudinal axis B of the tool. This arrangement precludes the stretching outward of the hook **7**. As is seen in FIGS. **2** and **3**, the leading edge **10** of the hook **8** is immediately adjacent the end **13** of the aperture **12** in the hook **7**. If desired, the leading edge **10** may terminate slightly before the end **13** of the hook passage **12**.

FIGS. **4** and **5** illustrate the position of the hook **7** and tab **8** after the handles **4, 5** have been squeezed together and the tab **8** has been released from hook **7**. As shown in FIGS. **4** and **5**, after the handles **4, 5** have

been squeezed together, the hook **8** escapes from the hook passage **12** and moves to the position shown in FIG. **4.** The arrow C in FIG. **2** indicates the direction which the arm **9** carrying the tab **8** will follow when the handles **4, 5** are squeezed together in the position shown in FIG. **4.**

The position of the handle **5,** the arm **9** and the tab **8,** as shown in FIG. **4** is the "as molded" position. When unrestrained, arm **9** will move the hook **8** to the "as molded" position due to the elastic memory of the plastics material. The handle **5,** arm **9** and tab **8** are preferably an integral structure formed, for example, by means of injection or compression molding. This not only assures the proper relationship of the handle **5,** arm **9** and tab **8** with respect to one another, but also minimizes the dangers of having the arm **9** becoming detached from handle **5,** which might otherwise occur if the arm **9** and tab **8** were formed of one piece and then secured to a separately molded handle **5.**

The arm **9** and tab **8** are so designed with respect to the hook **7** that the hook **7** will move along the path shown by the dotted arrow (FIG. **4**) and the leading edge **10** of the tab **8** will move along a path shown by the dotted arrow (FIG. **4**) when the handles are urged to the open position by means of spring **6.** Thus, because of the spacing between the leading edge **10** of the tab **8** and the cam surface **7***b* of hook **7,** there is little danger of the tool becoming inadvertently latched while in use, and the elastic memory of the plastics material used to form the handle **5,** arm **9** and tab **8** will urge the tab **8** to the position as shown in FIG. **4,** thereby maintaining this spacing.

As an additional precaution against the inadvertent latching of the tool during use, cooperating cam surfaces **7***b* and **8***b* are provided on the hook **7** and tab **8,** respectively, so that the tab **8** will cam off of the hook **7** when the tool is being used, if the hook and tab become too close. This will still leave the tool in an operational state.

FIGS. **6** and **7** illustrate a modification of the invention, wherein the tab **8** is replaced by a cylindrical tab **30.** The tool is otherwise as depicted in FIGS. **1–5.** The cylindrical tab **30** functions in the same manner as the substantially elliptical tab **8** shown in FIGS. **1–5,** the curved surface of the cylindrical shape providing the two cam surfaces **8**a and **8**b of the generally elliptical tab **8.**

The handles **4** and **5** may be formed separately and then attached to the working elements **2** and **3,** such as by press-fitting the handles over the working elements. Alternatively, the handles **4, 5** can be molded around the working elements **2, 3.** Both alternatives are used commercially and need not be discussed in detail herein.

While the invention has been described and illustrated with respect to certain preferred examples which give satisfactory results, it will be understood by those skilled in the art after understanding the principle of the invention, that various other changes and modifications may be made without departing from the spirit and scope of the invention, and it is intended therefore in the appended claims to cover all such changes and modifications.

What is claimed is:

1. In a hand tool having a pair of working elements, an elongated handle attached at one end to each working element, pivot means for pivotally connecting one handle and working element to the other and spring means urging the handles apart, the improvement which consists of a latch means comprising:

a flexible plastic or rubber arm centrally disposed on the other end of one handle and having a normal position extending away from said handle at an acute angle thereto and toward said other handle, said arm having an elastic memory such that said arm urges itself back to said normal position when bent to another position;

an elongated tab having upper and lower convex surfaces, the free end of said arm being connected to the upper surface of the tab substantially at the middle of the tab; and

a hook means on the other end of said other handle, said hook means comprising a pair of opposed walls having convex tops and forming therebetween a passageway accommodating said arm when said latch is latched, each wall having a notch tapering inwardly from the edge of the wall remote from the one handle to the edge of the wall adjacent the one handle for accommodating at least a portion of said tab, said notch being substantially complementary to said portion of said tab and permitting free passage of said tab in and out of said notch, the lower surface of said tab when said arm is in the normal position being spaced from the convex tops of said walls.

2. The device according to claim **1,** wherein said arm, tab and notch are so disposed to one another that when said tab is in said notch the forces exerted by said spring means on said tab and said hook are on a line perpendicular to the longitudinal axis of the tool.

3. The device according to claim **1,** wherein the one handle, the arm and the tab form an integral molding, the arm being molded in said normal position.

4. The device according to claim **1,** wherein said arm and tab are made of polyvinyl chloride.

5. The device according to claim **1,** wherein said tab is substantially elliptical in cross-section taken transverse to the longitudinal axis thereof.

6. The device according to claim **1,** wherein said tab is substantially circular in cross-section taken transverse to the longitudinal axis thereof.

7. The device according to claim **1,** wherein said tool is a scissors, shears, pruner or snips.

8. The device according to claim **1,** wherein the one handle, the arm and the tab form an integral molding, the arm being molded in said normal position, and the other handle and the hook means form an integral molding, said handles, arm, tab and hook means being of polyvinyl chloride.

* * * * *