July 7, 1970 W. A. ERHARDT, JR 3,519,188

FASTENER ATTACHING PLIERS

Filed Jan. 10, 1968 2 Sheets-Sheet 1

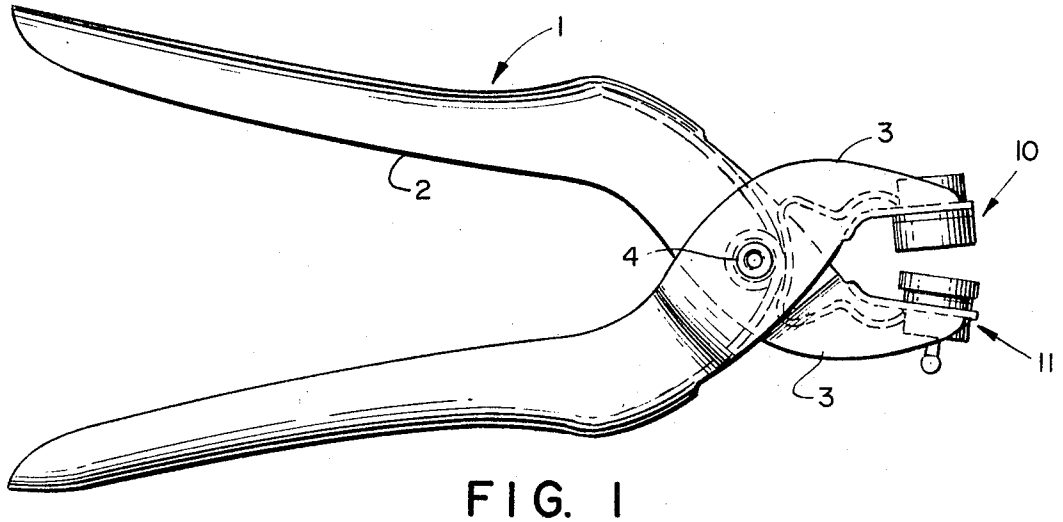


FIG. 1

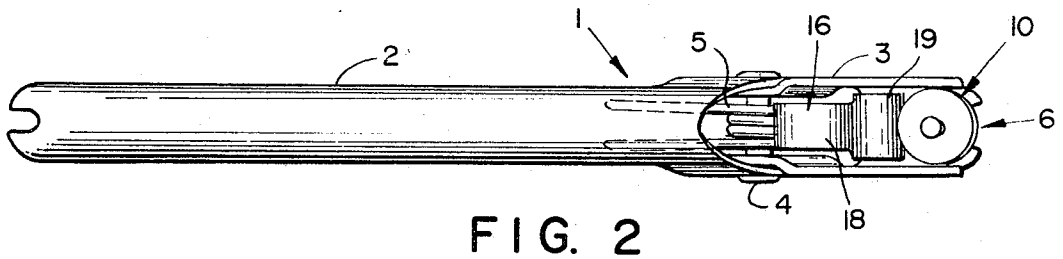


FIG. 2

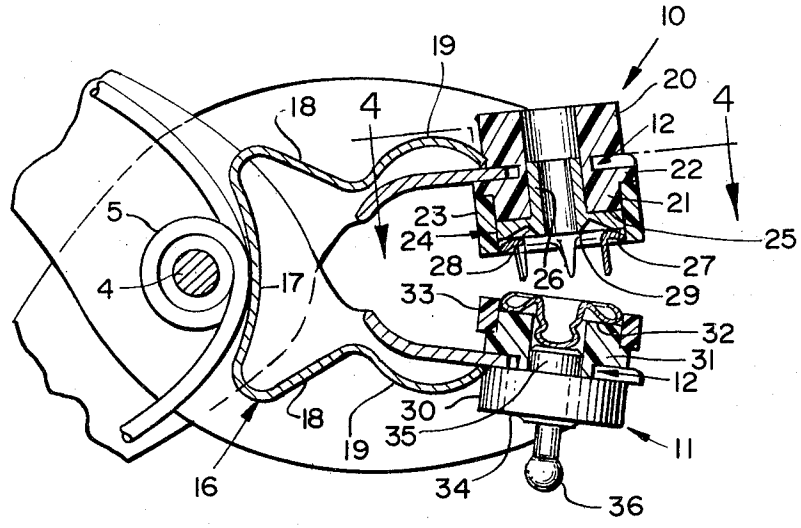


FIG. 3

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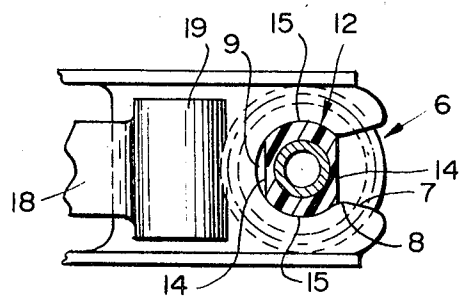


FIG. 4

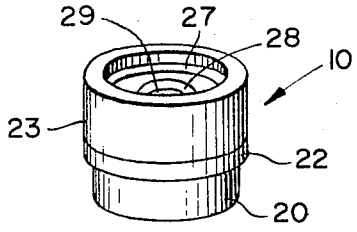


FIG. 5

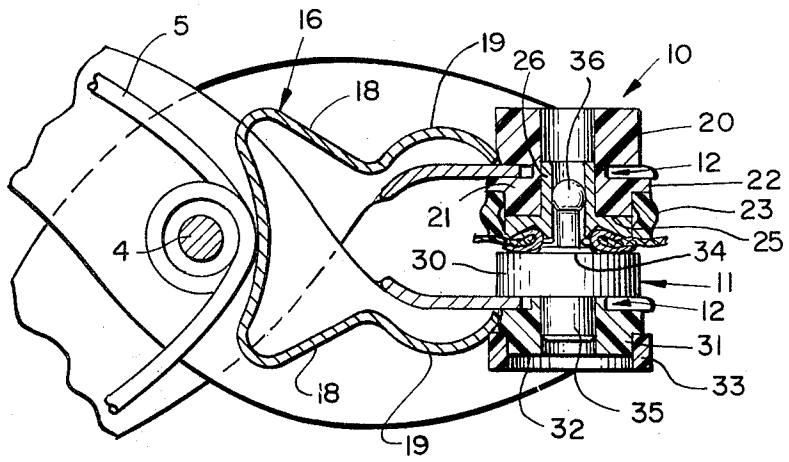


FIG. 6

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FASTENER ATTACHING PLIERS

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U.S. Cl. 227—144 4 Claims

ABSTRACT OF THE DISCLOSURE

A fastener attaching pliers carries setting tools which are removably mounted in the pliers jaws. In one mounted position of the setting tools the pliers are adapted for the attachment of snap fastener stud and socket components to a workpiece. When one of the setting tools is removed and remounted in an inverted condition, the pliers are adapted for setting eyelets in a workpiece.

BACKGROUND OF THE INVENTION

Field of the invention

The invention relates to fastener attaching pliers particularly of the type having interchangeable attaching tools for setting different types or sizes of fasteners. Pliers of the type disclosed herein are normally, although not exclusively, sold at notion counters as part of a kit containing the pliers and various sizes of snap fasteners and eyelets to be applied to homemade garments such as children's clothing or to replace snap fasteners or eyelets which have been damaged or loosened due to wear and/or repeated washing and ironing of a garment. This is a highly competitive retail market in which the price and flexibility of one's product are of paramount importance. Since the cost and quality of fasteners has become rather well standardized over the years, it has recently become evident that a competitive lead is to be achieved, if at all, through improvements in the attaching pliers which provide for a wider range of usage and easier handling by the consumer at a cost which is at least equal to but preferably less than that of competing products.

Description of prior art

In many of the known devices the fastener setting tools are permanently secured to the pliers jaws by riveting or swedging. In others the tools are secured by plastic grommets or plastic snap-in nuts or plastic drive pin rivets. Thus, it is rather difficult for the user, particularly a housewife, to change the setting tools for attaching different types and sizes of fasteners. Further, the above-mentioned means for securing the setting tools to the jaws usually dictate that only a single setting die or anvil can be embodied in each of the pair of individual tools mounted on the jaws at one time.

In still another known arrangement a rotatable turntable which is resiliently mounted on one of the pliers jaws carries both a snap fastener supporting die and an eyelet-setting die post. This is a rather sophisticated and expensive assembly by comparison with the present invention and the resilient mounting includes a separate spring and collar which must be removed and replaced by one desiring to change tools for attaching differently sized fasteners.

SUMMARY OF THE INVENTION

In the illustrated embodiment of a fastener attaching pliers each of the jaws has an elongated slot opening at the end thereof remote from the handles. Each of the jaws carries a fastener setting tool which includes a mounting post that is contoured to pass into and out

of the slot in one attitude and to be locked in the slot by a fractional turn of the tool either clockwise or counterclockwise from that one attitude. One of the tools includes a snap fastener pronged ring supporting die and an eyelet setting anvil. The other tool carries a snap fastener stud or socket supporting die at one end thereof and an eyelet-setting die post at its other end, which die post is axially aligned with the center of the stud or socket supporting die. The pliers are therefore readily convertible from a snap fastener attaching device to an eyelet setting device by rotating the second tool to the attitude in which the mounting post is unlocked and will pass out of the slot, removing the tool, inverting the tool, reinserting it in the slot and relocking it by a fractional turn. Should one desire to attach a different size fastener, both tools can be readily replaced by another set embodying appropriately sized dies, die posts and anvils.

The illustrated embodiment also includes a sheet metal spring which is mounted in the jaws and has a leaf located adjacent the inner end of each slot. When the tools are in the locked position the spring leaves bias the mounting post against the edges of the jaws defining the slots to insure a positive lock. The spring also tends to eject the tools from the slots when the mounting posts are oriented in the insertion and removal attitude, thereby aiding in the removal of the tools and also providing an indication to the user that the tools have been turned sufficiently to achieve the locked condition.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevational view of the fastener attaching pliers;

FIG. 2 is a top plan view of the pliers;

FIG. 3 is an enlarged view of the pliers jaws with the setting tools shown partly in cross section. One tool carries a pronged ring and the other a snap fastener stud component;

FIG. 4 is a section taken on line **4**—**4** of FIG. 3;

FIG. 5 is an inverted perspective view of one of the fastener setting tools; and

FIG. 6 is a view of the pliers jaws similar to FIG. 3 with one of the setting tools inverted and the jaws closed to set an eyelet in a workpiece.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The fastener attaching pliers **1** include a pair of handles **2** and a pair of jaws **3** which are pivotally connected by a pin **4** and normally biased into the jaw-opened condition by a wire torsion spring **5** supported by the pin **4**. The end of each jaw remote from the handles has an elongated, open-ended slot **6** formed therein. The slot **6** includes a setting tool receiving portion **7** which tapers inwardly from the open end and communicates at a narrowed throat **8** with an inner, generally circular setting tool retaining portion **9**.

Each of the jaws **3** carries a fastener setting tool **10** and **11** respectively. The setting tools are of molded plastic frame construction and generally cylindrical in configuration. The frame of each tool consists of two spaced sections which are connected by a hollow mounting post **12**. As best seen in the cross-sectional view of FIG. 4, the mounting post **12** has an external, generally oblong configuration defined by parallel sides **14** and arcuate ends **15**. The distance across the parallel sides **14** is just slightly less than the width of the slot **6** at the throat **8** and the arcuate ends **15** lie on an imaginary circle having a diameter approximately equal to the diameter of slot portion **9**. Thus, the tools may be readily removed from the jaws by rotating them a quarter turn from the attitude depicted in FIG. 4 and withdrawing the post **12** through slot portion **7**. When the tools are remounted, the inwardly con-

verging sides of slot portion **7** provide a guide or lead-in for the post **12** which freely passes into the slot portion **9**, whereupon a quarter turn will relock the tool. Since the length of the post **12** and therefore the gap between the tool frame sections is approximately equal to the thickness of the jaws adjacent the slots **6**, the tools fit rather snugly in the jaws when the specified dimensions of the specific parts are closely held. However, since it is recognized that mass production molding of the setting tool frames and stamping and blanking of the pliers jaws will inevitably result in high and low side tolerance variations on mating parts a sheet metal spring **16** having a generally U-shape and including a humped back portion **17** and two leaves **18** having arced ends **19** is mounted in the jaws with the back portion bearing against the pivot pin **4** and the arced ends of the leaves resting on the jaws slightly to the rear of the closed end of slot portion **9**. The leaf ends **19** bear against the upper sections of the setting tool frames and bias the ends **15** of the mounting posts **12** tightly against the jaw edges defining the slot portion **9**, thereby insuring a snug positive lock. When the tools are quarter turned and unlocked, the spring **16** tends to eject the post **12** from the slot **6** thereby assisting in tool removal. When the tools are being inserted, the bias of the spring on the frames serves as an indication that the tools have been turned sufficiently to achieve the locked condition, since as aforesaid the spring tends to eject the tools when the sides **14** of the post **12** are aligned with the throat **8** of the slots **6**.

As best seen in FIGS. 3, 5 and 6 the frame sections **20** and **21** of the setting tool **10** are hollow cylinders having a central bore in communication with a bore in the mounting post **12**. The section **21** has a peripheral flange **22** which supports an elastic ring **23** that is bonded to the flange and the periphery of the section extending beyond the flange. A machined metal fixture **24** has a base **25** which is bonded to the face of the frame section **21** remote from the jaw, an integral, tubular stem **26** which is press fitted in the communicating bores in the frame section **21** and mounting post **12**, a pronged ring supporting die **27** and an eyelet setting anvil **28** having a central opening **29**. The outer end of the elastic ring **23** extends beyond the die **27** and frictionally grips the outer edge of the snap fastener attaching pronged ring to hold it in place against the die.

The frame sections **30** and **31** of tool **11** are similar to frame sections **20** and **21**, respectively, of the tool **10** described above. The upper face of section **31** is a supporting die **32** for the pronged turning and clenching body of a snap fastener. The elastic ring **33** which is bonded to section **31** frictionally grips the peripheral edge of the snap fastener to hold it in place against the die **32**. The frame section **30** carries a machined metal fixture having a base **34** which is bonded to the lower face of the section as viewed in FIG. 3, a solid plug **35** which extends normally in one direction from the base and is press fitted in the aligned bores in frame sections **30**, **31** and mounting post **12**, and an eyelet orienting and work piercing post **36** which extends outwardly from the base **34** in a direction opposite the plug **35**. The base **34** and post **36** constitute an eyelet-setting die post. One will observe that the plug **35** stops short of the upper end of the bore in section **31** to provide a clearance recess for the stud of the snap fastener component.

With the pronged ring and fastener components positioned in the tools as shown in FIG. 3, the workpiece is inserted between the open jaws and the jaws thereafter closed causing the prongs to pierce the work and turn into the prong turning and clenching body of the stud or socket component, as the case may be, in the manner well known to those familiar with the snap fastener arts.

When it is desired to set an eyelet in the work, the

setting tool **11** is removed from the jaws and remounted in the inverted position shown in FIG. 6. The eyelet is then placed on the die post **34**, **36** with the end of its shank adjacent the free end of the post. As the jaws are closed the end of the post first passes into and cooperates with the edge of the opening **29** in the tool **10** to pierce the work, after which the eyelet shank is turned over the edge of the pierced hole by the anvil **28**.

Should one desire to attach differently sized eyelets or snap fasteners to the work, both tools **10** and **11** may be removed and replaced by tools appropriately sized for setting the other fasteners. This capability would, of course, depend on the number of sets of setting tools supplied with the kit.

I claim:

1. A fastener attaching pliers comprising

(a) a pair of handles,

(b) a pair of jaws,

(1) at least one of said jaws having an elongated slot in the end thereof remote from said handles, said slot including a setting tool receiving portion and a setting tool retaining portion,

(c) pivot means intermediate said handles and jaws,

(d) a fastener setting tool mounted on each of said jaws,

(1) at least one of said tools having an integral mounting post which is contoured to pass into and out of the setting tool receiving and setting tool retaining portions of said slot in one attitude and to be locked in said setting tool retaining portion responsive to a fractional turn thereof from said one attitude,

(2) one of said setting tools embodying a pronged ring supporting die and an eyelet setting anvil,

(3) the other of said setting tools embodying a snap fastener component supporting die and an eyelet-setting die post, said snap fastener component supporting die and eyelet-setting die post being disposed at the opposite ends of axially aligned sections of said other setting tool,

(e) said pliers being readily convertible from a snap fastener attaching device to an eyelet setting device by manual removal, inversion and remounting of the other of said setting tools.

2. A fastener attaching pliers according to claim **1** including means normally biasing said jaws away from one another.

3. A fastener attaching pliers according to claim **1** including means which bias said mounting post against the edge of said jaw defining said setting tool retaining portion of said slot when said mounting post is fractionally turned from said one attitude, which means tend to eject said mounting post from said slot portion when said post is disposed in said one attitude.

4. A fastener attaching pliers according to claim **3** wherein said means is a spring mounted on said jaws between said pivot means and said slot.

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U.S. Cl. X.R.

29—52, 143; 81—5.1