Jan. 18, 1938. F. E. NODINE 2,106,012

COLORED FASTENER ELEMENTS AND METHOD OF MAKING THEM

Filed Sept. 15, 1934

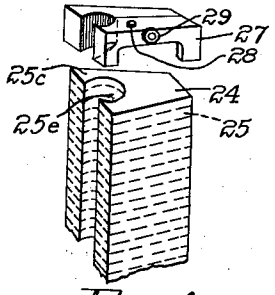


Fig. 4.

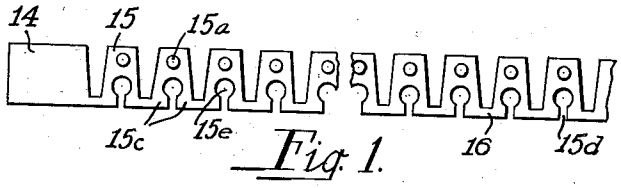


Fig. 1.

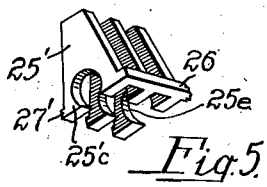


Fig. 5.



Fig. 2.

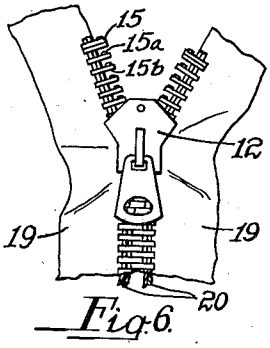


Fig. 6.

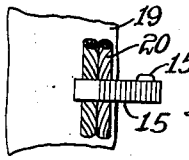


Fig. 3.

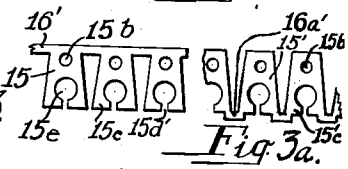


Fig. 3a.

Fig. 7.

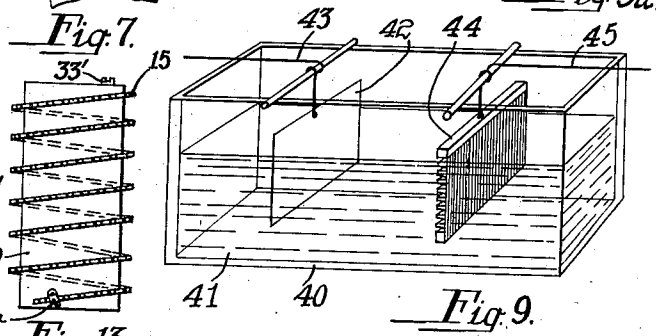


Fig. 13.

Fig. 9.



Fig. 11.

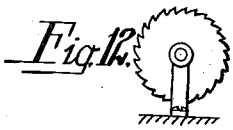


Fig. 12.

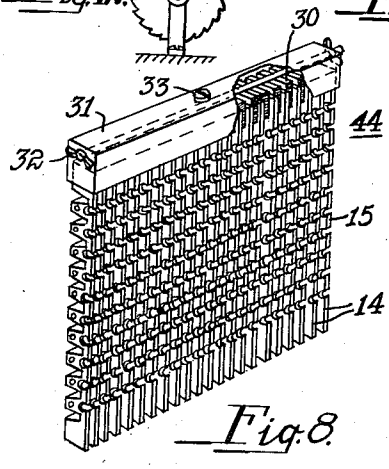


Fig. 8.

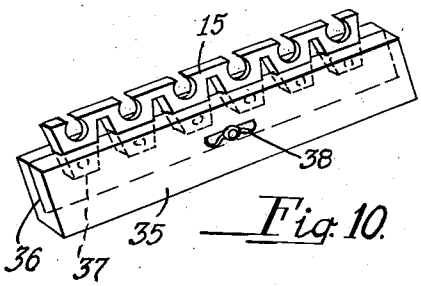


Fig. 10.

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Patented Jan. 18, 1938 2,106,012

UNITED STATES PATENT OFFICE

2,106,012

COLORED FASTENER ELEMENTS AND METHOD OF MAKING THEM

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Application September 15, 1934, Serial No. 744,184

9 Claims. (Cl. 29—148)

This invention relates to interlocking fasteners or clasps, to procedure employed in forming and assembling such elements, and more particularly, to colored fasteners or clasps.

The effectiveness of interlocking fasteners when employed to quickly separate and shut opposed edges of an opening has given rise to the need for fastener assemblies which are more pleasing to the eye, and this is especially true where color schemes are stressed, as in wearing apparel.

As a result, many attempts have been made to devise some effective and efficient procedure for coloring the now commonly-employed metal fastener elements, but no practical procedure has been heretofore produced, and for this reason the attempt has been made to substitute celluloid elements or elements constructed from similar material where coloring is desired. There are certain limitations in the manufacture, assembly, and use of such elements and consequently, it is highly desirable to produce metal fasteners in color.

It has been found that dyes, enamels, paints, etc., will not readily adhere to metallic elements; but, in any event the size and character of the individual elements going into the make-up of such fasteners, is such as to present almost insurmountable difficulties in the effective application of paints, enamels, dyes, etc., without unduly increasing the cost of manufacture or without detracting from the effectiveness of the fastener.

The elements of interlocking fasteners are usually bronze, aluminum, or some similar metal, and each element is usually individually formed with the result that any coloring procedure employed necessitates the handling and treatment of individual elements. I have discovered that the most effective way of applying color to fastener elements is to employ an electrolytic process as a preliminary to or during the coloring operation. It is, however, apparent that such a procedure involves the necessity of providing a good electrical contact between each element so treated and one terminal (for example the anode) of the electrolytic apparatus and that this presents difficulties where each of the individual elements are completely formed and separated prior to employing the electrolytic process.

An object of my invention, therefore, involves procedure for manufacturing the separate elements of an interlocking fastener such that the coloring operation may be carried forward so as to avoid the necessity of handling and, in effect, individually treating each small element during the coloring operation, and during procedures preliminary thereto.

In the manufacture of interlocking fasteners it is highly desirable to employ a light metal such as aluminum, and one of the features of the present invention is the procedure employed for manufacturing and coloring aluminum fastener elements.

A further object of my invention is to produce a procedure for so manufacturing the individual elements of an interlocking fastener that the coloring procedure and the subsequent procedures of assembling the individual elements onto stringers is materially simplified.

A further object of my invention is to provide a coloring procedure which will produce the effect of multiple coloring of each individual fastener element.

A still further object is to provide a two-tone element and an improved procedure for producing such an element.

These and other objects which will be made more apparent throughout the further description are accomplished by the procedure herein set forth as my present preferred procedure.

Figure 1 is a longitudinal side elevation of a series of fastener elements shown in a connected series with a strip from which they are formed. This figure illustrates generally, an initial step in a procedure here contemplated.

Fig. 2 is a fragmental side elevation somewhat similar to Figure 1, but showing a modified form of fastener element and a modified form of connection between elements. The figure also illustrates a modification of the procedure for forming the elements.

Fig. 3 is a fragmental side elevation of a plurality of fastener elements in a strip form somewhat similar to Fig. 1, but showing a modified form of connection between elements and also showing the opposite side of a strip from that shown in Fig. 1.

Fig. 3*a* is a fragmental side elevation of a plurality of elements in strip form somewhat similar to Fig. 1, but showing another modified form of connection between elements. Figs. 3 and 3*a* each illustrate a slight modification of the procedure for forming the elements.

Fig. 4 is a longitudinal perspective view in elevation of a partially formed bar from which fastener elements are to be severed. This view also shows, in an exploded position, a suitable clamp for holding the bar suspended within a bath.

Fig. 5 is a longitudinal perspective section in

elevation of a modified form of element bar. This figure shows individual fastener elements partially formed in a manner somewhat similar to that indicated by the dotted lines of Fig. 4; and, both Figs. 4 and 5 may be considered as illustrating steps in a procedure for forming colored individual fasteners.

Fig. 6 is a fragmental plan view illustrating fastener elements in place on carrier members or stringers and showing some of the elements in an interlocking position and others disengaged from that position.

Fig. 7 is a fragmental enlarged section taken from Fig. 6, and shows an individual fastener element having a two-tone color which is obtained by procedure hereinafter described.

Fig. 8 is a perspective view of a group of fastener strips such as shown in the embodiments of Figs. 1 to 3*a*, inclusive. The strips are suspended from a common carrier magazine and are spaced with respect to each other.

Fig. 9 is a diagrammatic perspective view illustrating an electrolytic bath having an anode and cathode, one of which may include a group of elements such as shown in Fig. 8.

Fig. 10 is a side perspective view of a modified form of carrier for suspending a strip of fastener elements, such as shown in Figs. 1 to 3*a*, inclusive.

Figs. 11 and 12, respectively, show a buffer (or grinding wheel) and a cutting blade which may be employed, if desired, in connection with my procedure.

And, Fig. 13 is an elevation of a modified form of strip carrying element and a strip positioned thereon for treatment, as in a bath.

In carrying out my invention, I prefer to partially form a fastener element while retaining it in strip formation or in a connected relationship with other elements. This may be accomplished in such a way that the final operation of completing each individual element amounts to nothing more than severing the individual elements from the strip of which they form a part, or from the connected relationship. For the purpose of simplifying the operation of coloring the elements and of simplifying both the procedure preliminary and subsequent to the coloring operation, I preferably retain the elements in strip formation or a connected relationship and while in this form, I treat such portions of the surfaces of the individual elements as are to receive color by a procedure which renders those surfaces absorbent to coloring material. The coloring material may be applied simultaneously with or subsequent to this treatment, but in any event the elements are preferably retained in strip formation until after the coloring operations are completed. As set forth by my Patent No. 1,890,335, the individual elements may be retained in strip formation until after the tapes or stringers are inserted in the apertures formed in their base portions. The final operation of completing each element or severing it from the strip or association of which it forms a part, will produce a bare metal or uncolored surface adjacent to or surrounded by the colored surface, thus presenting the multi-colored or two-toned effect heretofore mentioned.

The preferred method of rendering surfaces of the elements color-absorbent is to subject those surfaces to an oxidizing operation. This is preferably accomplished by an electrolytic process wherein the elements, while retained in strip formation or in connected relationship, constitute the anode of an electrolytic apparatus and are submerged in a suitable electrolyte. Where the strips are relatively short, a carrier element such as disclosed in Figure 8 may be employed, thus assembling a number of such strips in such a way that each is electrically connected to the carrier element and each therefore is effective as an anode during the electrolytic operation. Where relatively long strips are produced, the strips may be handled in coil formation and any suitable means such as the carrier element **44'** disclosed in Fig. 7 may be employed for insuring a separation of the individual elements included in the coil, and at the same time, insuring a proper electrical contact with all of the elements while the elements are subjected to the action of the electrolyte during the electrolytic process.

Any suitable means may be employed for shielding portions of the strip surface from the action of the electrolyte during the electrolytic process. See for example, Fig. 10. As before stated, the coloring material may be applied at or subsequent to the oxidizing operation.

Although the procedures hereinafter described and indicated may be readily accomplished by suitable machinery, for the purpose of simplifying illustration, I will point out my invention more or less from the standpoint of manual procedure.

As shown in Figure 1, a strip **14** may be partially formed by feeding it to a stamping machine to progressively die form or stamp it until a desired unitary length of elements has been produced. See my Patent 1,890,335 of December 6, 1932 entitled "Separable fasteners and method of making same". In Figs. 2, 3, and 3*a*, I have shown somewhat modified types of fastener elements which may be formed by the same step-by-step procedure employed in connection with the elements of Figure 1. However, in forming the strips such as illustrated in Figs. 1 to 3*a*, inclusive, any suitable procedure may be employed.

In Fig. 1, a strip **14** is shown having a plurality of elements **15** which are connected by lugs **16**. Each individual element **15** has a suitable interlocking protuberance or lug **15***a* (see Figs. 1 and 2) on one side face and an oppositely positioned socket **15***b* (see Figs. 3 and 3*a*) on the other side face; suitable jaws or legs **15***c* are formed on opposite sides of a base recess **15***d* which terminates in a carrier-cord receiving aperture **15***e*.

In the modified form of element shown in Fig. 2, the top portion **15''***f* is smoothly and continuously curved, and the aperture **15''***e* does not have an extending recess such as **15***d* of the embodiments of Figs. 1 and 3. Figs. 1 to 3*a*, inclusive, show that the connecting portions or lugs **16**, **16'**, **16''**, and/or **16***a'* may be located between the bottom, base, top, or side edge portions of adjacent elements. However, any suitable means for connecting adjacent elements may be employed as long as the elements are retained in strip formation or connected relationship at least until the coloring operation is completed.

As will appear from Fig. 6, the side edges of the individual elements of an assembly have relatively greater prominence to the eye than other portions thereof and, if it is desirable to manufacture elements having a single tone appearance, procedures such as illustrated in Figs. 4 and 5 or Fig. 3*a* may be employed during the preliminary operations of forming the elements.

In Fig. 4, I have shown a partially formed bar of material **24** and have indicated by dotted lines how individual elements may be severed therefrom. I preferably provide a rectangular

piece or bar having inclined sides of a contour corresponding generally to the desired shape of an individual element. The form of the bar 24, before individual elements are severed therefrom, will depend somewhat upon the final form of each element, and also upon the procedure employed for completing the elements and/or the color effect to be produced.

In accordance with the procedure of Fig. 4, the side, top, and bottom edges of the bar 24 are shaped generally in accordance with the desired form of the individual elements and a recess 25e is also formed in the bar. The bar 24 may then be so treated as to render its surfaces color-absorbent, and this step may be followed by a severance of the individual elements along the dotted lines indicated, or the color may be applied prior to such severance.

The thus-formed individual elements 25 will have colored side, top, and bottom edges and side faces of a natural metal finish. The elements 25 will preferably be subjected to steps for forming suitable interlocking portions, such as indicated by numerals 15a and 15b in Figs. 1 to 3a, inclusive, after separation one from the other.

In a modified procedure illustrated in Fig. 5, I partially sever the elements 25' from the bar 24, leaving a connecting link or lug 26. See the application of Miller, entitled "Fastener elements and methods of producing them". In accordance with this procedure, the individual elements 25' are not only partially formed but are also spaced one from the other prior to the coloring operation and are maintained in a connected relationship at least throughout such portions of the coloring operation as render their surfaces or portions thereof color-absorbent.

Another preferred procedure for producing what may be termed single-tone or uniformly-colored fastener elements is shown in Fig. 3a. Here, the principle is applied that the bottom face of an element has very little visibility when the element is grouped in a fastener assembly, such as shown in Fig. 6. Explaining in more detail, the side edges of each element 15' are completely formed prior to the coloring operation, and the bottom lug 16a' is severed after the coloring operation.

The present invention deals primarily with the production of fastener elements having desired surface characteristics or colors and having two-tone, varied, or multi-tone color combinations, and more particularly, to metallic elements having such desired surface characteristics.

As previously pointed out, I preferably treat the material in such a manner that its surfaces become absorbent or receptive to suitable dyes or colors. I have found that aluminum is a very good material for surface treatment. And, in the procedure illustrated in Fig. 9, I render the surfaces color-absorbent by oxidizing them in an electrolytic bath. In carrying out such a process, the elements are preferably held in a connected or strip relationship and so employed as to serve as the anode of an electrolytic apparatus.

Contrary to what may be thought, the after-working of the elements or the after-severance of the elements does not spoil the color effect. On the other hand, it actually enhances it. For example, a severance of the connecting lugs 16 between the elements illustrated in Fig. 1, will produce a two-tone effect on their exposed side edges (see Fig. 7).

If it is assumed that the strip of elements illustrated in Fig. 1 has been provided with a coating of red dye and that the elements are subsequently, after having been secured in some suitable manner to a carrier 19, severed along the connecting links 16, the right-hand portion of each side edge of each element as shown in Fig. 7 will present a red appearance, while the left-hand portion will present a metallic appearance, i. e., a portion of the exposed edge of each element will be colored while another portion is uncolored, thus producing the two-tone effect.

The elements in strip or connected relationship are preferably oxidized in a suitable electrolytic bath 40 and while in that bath may be subjected to a dye or may, after washing, be subjected to a separate dyeing bath. As before stated the aluminum pieces to be oxidized serve as the anode in the electrolytic apparatus. It has been found that aluminum oxide is a very satisfactory coating, is stable when saturated with dyes, and readily absorbs many colors, such as blue, red, green, yellow, gray, etc. Flick Patent 1,526,167 of Feb. 10, 1925, discloses procedures which may be employed for coloring the partially formed elements or for rendering their surfaces color-absorbent.

In Fig. 9, I have somewhat diagrammatically shown a container 40 having an electrolytic bath 41 suitable for anodyzing strips 14 or groups of connected elements 15, such as illustrated in Figs. 1 to 5, inclusive. The anodyzing procedure employed may be as defined by the above-mentioned Flick patent.

When one or more strips of elements having a relatively short length are to be employed, as previously explained, they may be grouped in the manner shown in Fig. 8.

There a plurality of connected elements 15 are maintained in a separated relationship by suitable spacers 30 and are held within a magazine or multiple-clamp type of carrier 31. The carrier 31 may be provided with a removable clamping bolt 32 and a suitable electrical connection lug or screw 33. Although I have shown only one magazine or multiple clamp 31, any suitable number may be employed; and they may be mounted at each end of a group of strips, if desirable.

If however, it is desirable to employ relatively long, continuous, and/or connected lengths of elements, as previously pointed out, I preferably position or hold them in the form of a coil or spiral such as illustrated in the somewhat diagrammatic view of Fig. 13. The spiral of elements 15 is held on a drum 39 at one end by a clamp 39a, and at the other end by connection lug or terminal 33'. Of course, it will be apparent that a plurality of spirals may be grouped in the manner suggested by Fig. 8, and thus, color-treated. A spiral may also be suitably held at each end, and/or at points along its length to eliminate the drum 39. While various forms of holding devices may be employed, it is of primary importance that each partially formed individual element is in electrical contact with a terminal of the apparatus, so that it effectively serves as an anode in that apparatus.

In Fig. 9, I have shown a cathode 42 having an electrical connection 43, and an anode 44 having an electrical connection 45. The latter may comprise a spiral of connected elements (see Fig. 13), a group of connected elements (see Fig. 8), a

group of spirals, or a coil with the separate turns of the coil held in spaced relation.

After a group 44 has served as an anode and electrical current has been passed through it to oxidize or treat its exposed surfaces, see Fig. 9, it can be withdrawn with its coating of colored aluminum oxide and then washed to remove the adhering solution. After washing, the elements may be severed or may be mounted upon suitable carriers 19 and/or cords 20, and thence, may be severed in the manner defined by my above-mentioned Patent 1,890,335.

In Fig. 10, I have indicated another method of attaining a two-tone or multi-tone color effect. Here, a portion of an element strip 14 is held within the slot 37 of a clamping member 35 by a suitable adjustable clamp bolt 38; one clamp may be made fluid tight in any suitable way and it will be apparent that when the strip is submerged in an electrolytic solution that only the exposed portions will be processed and/or oxidized. If desired, the portions to be protected may be greased, insulated from the electrolyte, and/or treated with some suitable material to render them impervious.

By changing the position of the connecting links between the elements of a piece, such as illustrated by comparison of Figs. 1, 2, 3, 3*a*, and 5, it will appear that various color effects may be produced. If desired, two or more lugs may be provided between the elements of a connected strip or group (not shown). Then too, as illustrated in Fig. 5, suitable lugs or projections 27' may be left upon the legs, feet, sides and/or tops of the elements, and after the elements have been oxidized, these lugs may be cut off or severed (see Fig. 12) to produce various color effects. A buffer or emery wheel (see Fig. 11) may also be employed to expose the original surface of an element, of connected elements, or of a group of elements.

When the bar 24 of Fig. 4 is subjected to an electrolytic bath, it may be held by a two-part clamping member 27 having a clamping bolt 29 and an electrical connection 28. It will appear, as previously pointed out, that upon severance, only the top, bottom, and side edges of the separate elements will be colored and that the transverse sides will have a natural metal finish or appearance. However, the method indicated in Fig. 5 may be employed if the manufacturer wishes to color the sides as well.

Although I preferably employ a strip or an integrally connected element group in connection with the coloring procedure, yet, it will appear that separate elements may be clamped and/or in some other suitable manner held or secured together during this procedure, so that during the coloring or oxidizing treatment they are in fact held in a connected relationship.

I have found that many extraordinary and pleasing effects can be produced by selecting the color and/or the color combination of each individual element of an assembly (such as shown in Fig. 6). Thus, exceptionally beautiful patterns may be presented when opposite carriers 19 are interlocked and/or opened with respect to each other. By making the color of at least a portion of each element of a fastener assembly the same as the adjacent carriers 19 and/or cords 20 upon which they are mounted, an assembly having large and strong elements may be given a smaller appearance than the smallest elements that can be effectively employed.

Thus, while I have described procedure for forming treated, and/or colored fastener articles and for accomplishing many colored effects, it will be apparent to those skilled in the art that the various steps may be modified in view of each other, and in view of the illustrated disclosures and the suggestions enumerated in my specification, and that various combinations, additions, and/or subtractions and other variations may be made without departing from the spirit of my invention as indicated by the appended claims.

What I claim as new and desire to secure by Letters Patent is:

1. The method of producing colored fastener elements which includes, selecting a piece of material from which individual elements are to be produced, forming the material into a plurality of individual elements while maintaining them in a spaced and connected relationship with respect to each other, holding the plurality of connected elements substantially in the form of a spiral while subjecting the elements to a surface anodyzing process, and thereafter, severing the individual elements from the strip thereby exposing the original grain color of the material.

2. The method of producing colored fastener elements which includes, providing a plurality of fastener elements having a connected relationship with respect to each other, and covering a portion of the surfaces of the connected elements while submerging the elements within and subjecting them to an electrolytic dyeing solution, so that the covered portion of the surfaces of the elements will have its original color, and then severing the connected fastener elements and exposing the original grain color of the material.

3. A plurality of at least partially-formed interconnected fastener elements of strip form, the sides of each element being spaced from the sides of adjacent elements, the base of each element being connected by a lug projecting outwardly from the bottom edges of the elements of the strip.

4. A fastener element having a multi-tone surface which includes a portion having the original grain color of a piece from which the element is formed, and an adjacent portion having an oxide colored by a dye.

5. A plurality of interconnected fastener elements of strip form, each element having a rounded top portion adjacent an interlocking portion thereof, each element having a carrier receiving bottom portion opposite the rounded top portion, the sides of each element being connected to the sides of adjacent elements at a point spaced from top and bottom portions of the elements.

6. The method of producing colored fastener elements which includes, selecting a piece of material from which individual elements are to be produced, forming the material into a plurality of individual elements while maintaining them in a connected relationship with respect to each other, the point of connection between elements being selected upon the basis of a proposed color combination, surface-coloring the strip of elements as a group, and thereafter, severing the individual elements from the strip in such a manner as to obtain, in the case of each element, a desired multi-color effect between the surface coloring and the natural color of a severed portion of the material utilized.

7. The method of producing colored fastener elements which includes, selecting a piece of metallic material from which individual elements are to be produced, forming the material into a

plurality of individual elements while maintaining them in a spaced and connected relationship with respect to each other, the point of connection between elements being selected upon considerations of a proposed multi-color combination on a given exposed surface of the elements, color-anodyzing the elements of the strip as a group, and thereafter, severing the individual elements from the strip in such a manner as to expose the original grain color of the metal and, in the case of each element, to obtain a desired multi-color effect between the anodyzed color and the natural grain color of the metal strip.

8. The method of producing an assembly of colored fastener elements which includes, grouping a plurality of strips of at least partially-formed elements in a transversely aligned and spaced relationship with respect to each other; holding said group of strips in such relationship while maintaining positive electrical connection with each strip adjacent one end of such group, while subjecting such group to an electrolytic surface-oxidizing coloring-treatment, and while associating a carrier with an element of a plurality of strips of the group, and thereafter, severing the individual elements from the strips of the group in such a manner as to attain a desired multi-color effect between the surface color and the natural grain color of the material from which the element is made.

9. The method of producing an assembly of colored fastener elements which includes, grouping a plurality of strips of at least partially formed elements in a transversely aligned and spaced relationship with respect to each other; holding said group of strips in such relationship while maintaining positive electrical connection with each strip adjacent one end of such group, while subjecting such group to an electrolytical anodyzing treatment, and while associating carriers with elements of strips of the group, and then severing the individual elements from the strip thereby exposing the original grain color of the material.

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