June 10, 1941. S. FREY 2,245,335

METHOD OF PRODUCING COLORED ZIP-FASTENER ELEMENTS

Filed Oct. 5, 1936

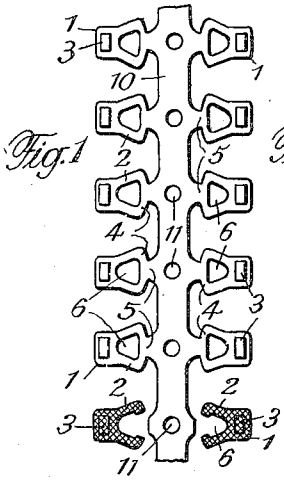

Fig. 1

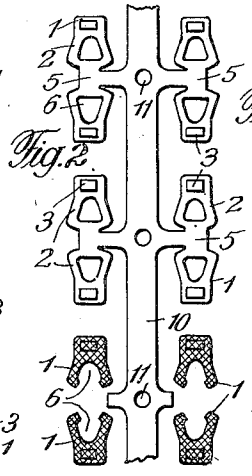

Fig. 2

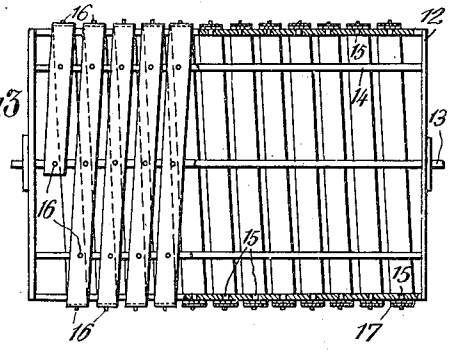

Fig. 3

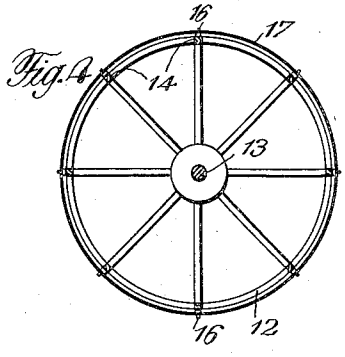

Fig. 4

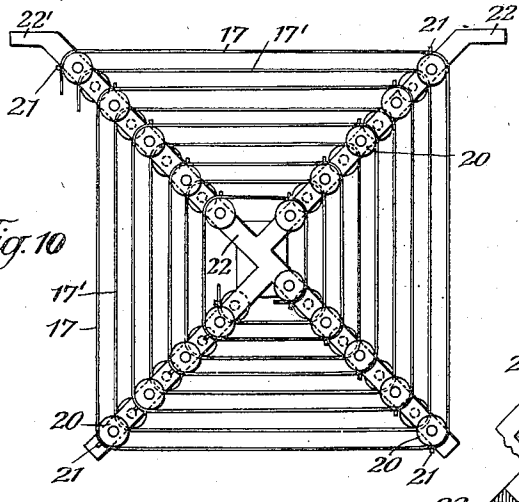

Fig. 10

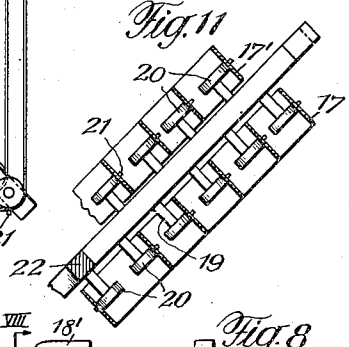

Fig. 11

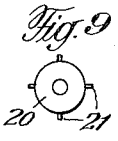

Fig. 9

Fig. 5

Fig. 6

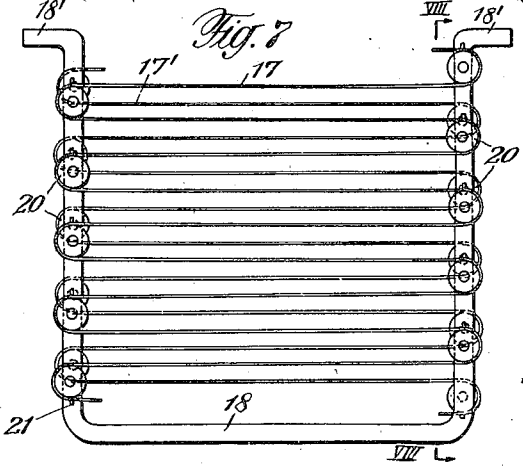

Fig. 7

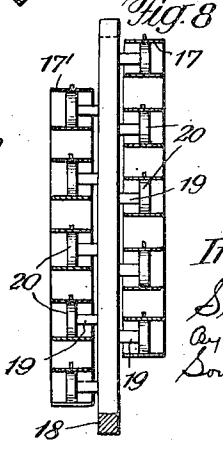

Fig. 8

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METHOD OF PRODUCING COLORED ZIP-FASTENER ELEMENTS

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Application October 5, 1936, Serial No. 104,138
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3 Claims. (Cl. 204—23)

This invention relates to methods for producing colored zip-fastener elements.

It is a common assumption that the closure generally termed "zip-fastener" would be still more used if it were possible to color the fastener elements in adaptation to the purpose they are to serve without incurring an increase of cost.

It has already been proposed to make the fastener elements of artificial resinous substances in order to obtain the desired color effect in this way. Such elements can, however, not compete with metal elements in regard to quality and are besides more expensive.

Several manufacturers have attempted to color each individual element electrolytically before attaching the elements to the supporting fabric band whereby the manufacture is obviously rendered expensive, so that up to the present colored zip-fasteners are not yet available on the market.

The object of the present invention is to provide a method of producing colored metal zip-fastener elements which is superior to the known methods in respect of economy of manufacture.

The method according to the present invention resides in so working a metal strip that the fastener elements are first formed integral with the material constituting the strip and in a condition ready to be colored, in order to provide for convenient handling during coloring so as to give them a colored aspect different from that which the material of the work strip originally had, for example, by coating the strips electrolytically.

By this means the coloring of zip-fastener elements is made practical, that is by coating the individual fastener element contained in strips with an artificial resin, or by coloring the strip chemically or electrolytically.

As metal strips from which the integral series of fastener elements are to be produced, strips of steel, copper, brass, argentan and so forth enter into question, but preferably strips of aluminium and magnesium alloys are applied.

A modified form of the method according to the present invention consists in preliminarily so stamping out the strips that a longitudinal supporting rib is left which serves as a current supply conductor for the entire strips during coloring the same electrolytically.

Due to this provision the electrolytic coloring operation is rationalised and the coloring thus obtained is of a uniform tone throughout.

In the accompanying drawing the method according to the present invention is illustratively exemplified by showings of several forms of the fastener element containing strips for severing zip-fastener elements therefrom, as well as carrier means for the strips for coloring the same, in which

Fig. 1 is a plan view showing a form of a metal strip containing fastener element;

Fig. 2 is a plan view of another form of the strip;

Fig. 3 shows an elevation of a carrier device with a metal strip wound thereon;

Fig. 4 shows a cross section of Fig. 3;

Fig. 5 is a view of a detail on a larger scale;

Fig. 6 is a view of another detail;

Fig. 7 shows an elevation of a modification of the carrier device;

Fig. 8 shows a section on the line VIII—VIII in Fig. 7;

Fig. 9 is a view of a further detail;

Fig. 10 shows an elevation of a cross-shaped carrier device, and

Fig. 11 is a section of Fig. 10 along one of the diagonals.

The metal strips are so stamped out in accordance with the profile of the fastener element to be produced that they contain the fastener elements integrally with the working material in substantially finished condition, thereby forming what may be termed a "blanked out" strip. The individual fastener elements are integrally connected with the working material by tongues left in the strips.

The flat fastener elements are colored when still integral with the working material, i. e. while connected to the tongues, whereupon the latter are removed and then the individual elements thus obtained are attached to the band. The disposition of the tongues is so chosen that, for example, the portions of the transverse members, that is, the attaching jaws of the elements, from which the tongues are removed, present a non-colored surface only exactly at the place where the elements bear against the band after having been pressed into engagement therewith, so that it appears to the eye that the whole zip-fastener element is colored.

In the example of the metal strip, as shown in Fig. 1, which is blanked out by stamping so as to form fastener elements therein, a supporting rib 10 is provided along each side of which, to the left and right in this figure, a row of fastener elements is arranged integral with the working material. The bodies 1 of the fastener elements are joined by means of two limbs 2 with the bead

on the fabric after having been severed from the strip.

The individual fastener elements are each connected with the carrier rib 10 by tongues 5 so as to be integral with the working material. Fig. 1 shows the last fastener element of each row, the superficial area of which is cross-hatched, to be severed from the rib 10 by punching. The carrier rib 10 is provided along its longitudinal center line with round holes 11 which are spaced apart equal distances which correspond to the spacing of the fastener elements of the two rows. These holes are subsequently caused to temporarily cooperate with a driving member for feeding the blanked out strip.

In the example depicted in Fig. 2, with the carrier rib 10 two rows of fastener elements are connected by tongues 5, the elements being turned through an angle of 90° as regards Fig. 1. The last pair of fastener elements of each row is shown to be severed from the rib 10.

This mode of arranging the fastener elements on the carrier rib, that is this manner of blanking out the metal strip renders possible, as compared with the immediately preceding example, to double up the production of fastener elements of the stamping device, while the number of strokes of the device remains the same.

In Figs. 3 and 4, numeral 12 designates a carrier drum formed by a metal cage, a mounting shaft being arranged centrally of the drum and carrier bars 14 divided about the circumference of the same. In these bars bolts 15 are screwed which are provided with reduced outer ends 16. On the drum 12, which is mounted on a rack, not shown, the blanked out strip 17 arriving from the stamping machine is wound contiguously in one and the same working operation. This blanked out strip, which, for the sake of clearness, is shown on the drawing in its original condition (without having fastener elements formed therein by stamping), is wound in helical shape on the drum 12 so that the holes 11 engage over the corresponding ends 16 of the bolts 15. The drum 12 is turned (by expedients not shown) in the corresponding direction, so that the winding of the blanked out strip is effected commensurate with its feed movement through the stamping machine. On the drum being completely wound, the wound on portion of the blanked out strip is cut off. The end 16 of some of the retaining bolts 15 is provided with a screw thread, as indicated in Fig. 6, to the effect that the blanked out strip 17 is secured to the respective bolt after slidingly engaging thereover by a screw nut 16' and is thus locked to the drum 12.

For the purpose of coloring the blanked out strip 17, i. e. the fastener elements, electrolytically, the drum 12 inclusive of the blanked out strip 17 wound thereon is then removed from the rack and consecutively submerged into a number of treatment baths. During this treatment the work blank carrier rib 10, as indicated in Figs. 1 and 2, serves as a current supply conductor, a conductive connection being arranged between the rib and the drum shaft 13 while the latter in turn is connected with one of the line conductors, and the vat itself provides the second line conductor.

The blanked out strip is conductively connected with the retaining bolts 15 at the points of engagement therewith. The strip engages with the retaining bolts 15 by means of annular contacting surfaces on the underside of the strip which are concentric with the holes 11.

On the termination of the coloring treatment of the blanked out strip in the vats, that is after the strip has assumed the desired color, the strip is wound off the drum 12 and the fastener elements are detached from the strip by punching. This is effected by severing the fastener elements at their limbs 2 where they were previously connected with the carrier rib 10 by the respective tongue 5. In consequence thereof, but small non-colored surfaces remain on the fastener element which are scarcely noticeable after the fastener element is attached to the fabric band.

In the Figs. 7 and 8, by 18 a metal carrier stirrup is designated the two arms of which are provided on opposite sides with bearing pins 19 and rolls 20 which, as shown in Fig. 9, carry tap bolts 21 on their circumference. About the rolls 20 arranged on one side of the carrier stirrup 18 a blanked out strip 17 is passed in serpentine- or zig-zag-shape, as shown in Fig. 7, so that the strip engages with the bolts 21 by means of corresponding holes formed therein. In a similar manner, about the rolls 20 on the opposite side of the carrier stirrup 18 a blanked out strip 17' is slung which contains stamped out fastener elements like the blanked out strip 17. The two groups of rolls 20 present are so staggered that the parallel portions of the two strips 17 and 17' placed thereon are offset relative to one another. The individual carrier stirrups 18 are adapted to be set on contact members provided on the various vats by means of terminal studs 18'. The rolls 20 in turn provide contact members for the strips.

In Figs. 10 and 11, by 22 a metal carrier of cross-shape is designated the four arms of which are provided on opposite sides with bolts 19 and rollers 20. About the rolls 20 arranged on one side of the carrier 22 a blanked out strip 17 is slung in spiral-shape, as shown in Fig. 10, so as to interengage with the bolts 21 on the rolls 20. In a like manner, on the group of rolls 20 disposed on the opposite side of the carrier 22, which group is staggered relative to the former group of rolls, a blanked out strip 17' containing fastener elements is placed. The carrier 22 is adapted to be set on contact members provided on the various vats by means of terminal studs 22'.

The latter two examples of stirrup carrier means are distinguished as requiring relatively very little space.

The blanked out strip may, for example, consist of iron, steel, copper, brass or argentan which materials are suitable for being colored by means of bath liquids passed through by electric current. Aluminium or alloys of aluminium and magnesium are particularly well suited for this purpose. In using such materials the coloring as such is not obtained by action of electric current, the latter having but the effect of preliminarily treating the blanked out strip so as to form a layer of metal hydroxide thereon with the property of so to speak absorbing liquids and thus also liquid pigments. Due to setting the carrier rib formed in the blanked out strip on separate contacting surfaces on the carrier device used for the treatment, a uniform flow of current through the fastener elements is ensured. In this way the surface treatment of the blanked out strip is rendered uniform particularly owing to the fact that the strip is submerged in the bath liquid freely accessible for the latter by being supported only at the contacting surfaces.

The arrangement and the shaping of the fastener elements in the blanked out strip may also be such that, instead of but one or two, a greater number of elements can be severed from the carrier rib by punching the strips at one and the same point.

I do not limit myself to the particular size, or shape, of the zip-fastener elements nor the particular size, shape, number or arrangement of parts of the device for carrying out the method of producing these elements, as shown and described, all of which may be varied without going beyond the scope of my invention as shown, described and claimed.

What I claim is:

1. In a method of producing electrolytically colored metal slide fastener elements clampingly engageable with a support in straddling relation thereto, the steps comprising shaping a strip of metal into a plurality of elements each having a pair of limbs adapted to clamp onto a support for use, said elements being fully formed except at the inner faces of the extremities of their limbs, the inner faces of said limb extremities being connected with a continuous self-supporting carrier rib constituted by a longitudinally extending central portion of the material of said strip and having connecting portions for the individual pairs of limb extremities, said connecting portions merging integrally into said limb extremities, punching holes in said rib at points adjacent said connecting portions for facilitating electrical connection to said rib throughout its length, applying an electrolytic coloring substance to said strip, connecting an electric current to said strip by pins extending into said punched holes to substantially uniformly distribute the electrolytic flow to the elements throughout the length of said strip for uniformly electrolytically coloring all of said elements, and removing said elements from said strip by severing same at the limb extremities, whereby the only portions of said elements not uniformly colored are the inner faces of the extremities which in use are clampingly pressed against a support and therefore are invisible.

2. In a method of producing electrolytically colored planar metal slide fastener elements clampingly engageable with a support in straddling relation thereto, the steps comprising stamping out a metal strip into a plurality of elements each having a pair of limbs adapted to clamp onto a support for use, said elements being fully formed except at the inner faces of the extremities of their limbs, the inner faces of said limb extremities being connected with a continuous self-supporting carrier rib constituted by a longitudinal portion of the material of said strip and having connecting portions for the individual pairs of said limb extremities, said connecting portions merging integrally into said limb extremities, and the planes of said elements extending parallel to said rib, punching holes in said rib at points adjacent said connecting portions simultaneously with said stamping, said holes serving to accommodate supporting pins for coiling said strip in timed relation to its feed movement through said stamping zone and for subsequently facilitating electrical connection to said rib at points distributed throughout its length, coiling said strip into helical convolutions by driving engagement with said punched holes by said pins from the interior of said coil so that said planes of the elements extend tangentially to the circumference of said coil, applying an electrolytic coloring substance to said strip, connecting an electric circuit to said strip at said holes by said pins extending into said holes to substantially uniformly distribute the electrolytic flow to the elements throughout the length of the strip for uniformly electrolytically coloring all of said elements, and removing said elements from said strip by severing same at the limb extremities, whereby the only portions of said elements not uniformly colored are the inner faces of the extremities which in use are clampingly pressed against a support and therefore are invisible.

3. In a method of producing electrolytically colored metal slide fastener elements clampingly engageable with a support in straddling relation thereto, the steps comprising shaping a metal strip into a plurality of elements each having a pair of limbs adapted to clampingly engage a support for use, said elements being fully formed except at the extremities of their limbs, the inner faces of said limb extremities being connected with a continuous self-supporting carrier rib constituted by a longitudinal portion of the material of said strip and having connecting portions for the individual pairs of said limb extremities, said connecting portions having transversely projecting elements engaging ends integrally merging in said limb extremities, punching holes in said rib at points adjacent the connecting portions to facilitate handling the strip in an electrolytic coloring process on pins extending into said holes and for connecting an electric circuit to said strip at points throughout its length to render the electrolytic flow to said elements substantially uniform throughout the length of the strip, applying an electrolytic coloring substance to said strip, connecting an electric circuit to said rib through said pins and holes, and removing the elements from said connecting portions by breaking free the areas of connection with said connecting portions, the integral connections with the connecting portions being the areas of breaking of said material required.

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