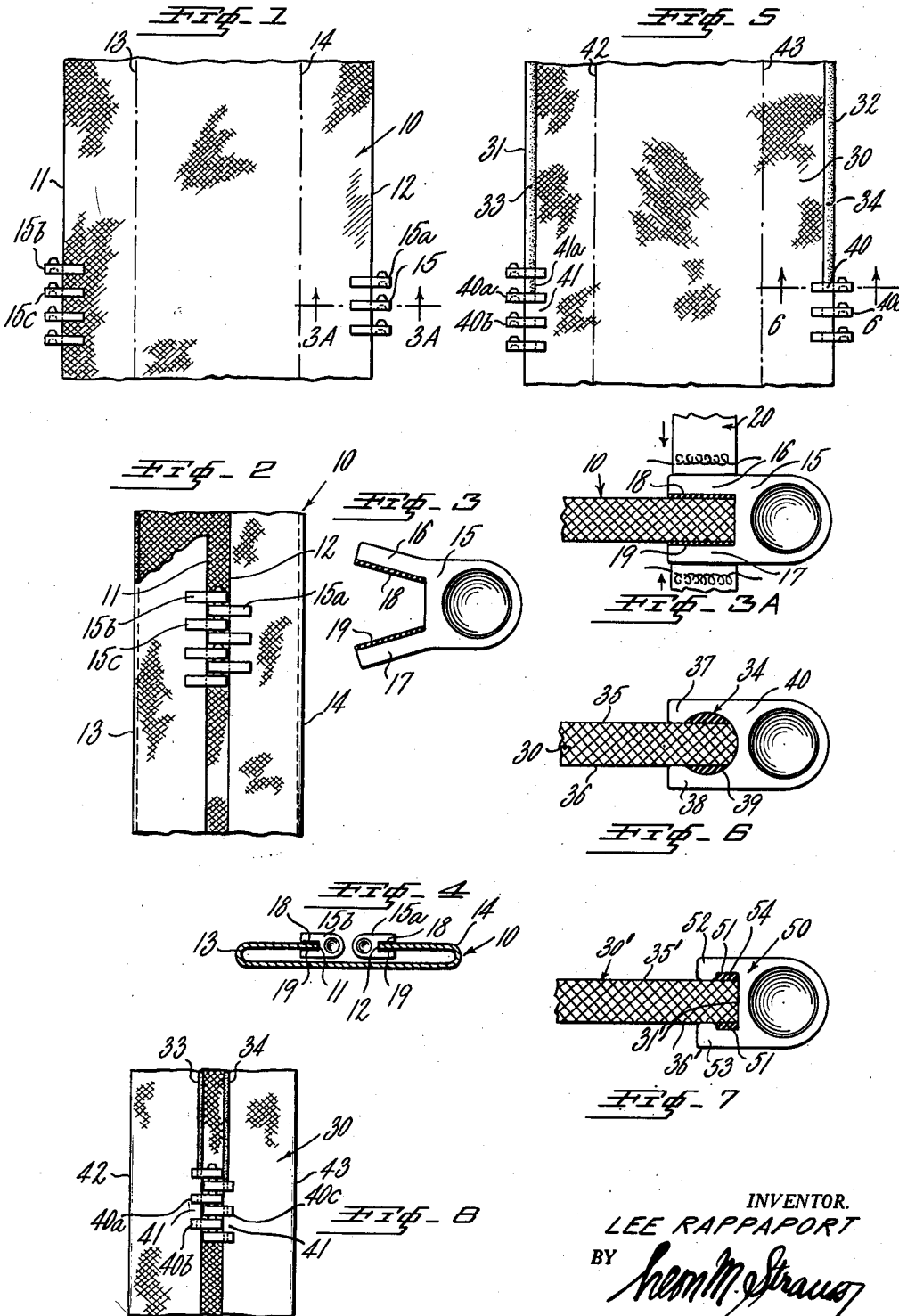


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METHOD OF APPLYING SLIDE FASTENER ELEMENTS
TO CARRIERS OF METAL OR WIRE MESH
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METHOD OF APPLYING SLIDE FASTENER
ELEMENTS TO CARRIERS OF METAL OR
WIRE MESH

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1 Claim. (Cl. 29—148)

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This invention relates to a method of applying slide fastener elements to carriers made of metal or wire mesh for use in the manufacture of wrist watch straps, bracelets and other articles.

It is one of the objects of the invention to provide means facilitating direct connection of slide fastener elements to wire mesh or similar carriers without the intermediary of a stringer or like structure.

It is another object of the invention to provide a method enabling the placement and securement of slide fastener elements in spaced apart relation over the outer edge of a piece of wire mesh and to affix said elements to the latter by any metal bonding process, such as soldering, welding and the like.

It is a further object of the invention to provide a new method according to which a seam of solder or like binder is deposited on opposite surfaces along the free edge portion of a wire or like mesh to which fastener elements are subsequently applied in spaced apart relation to each other so that they extend over said seams, and finally removing seam portions disposed between adjacent fastener elements whereby the flexibility of said wire mesh is substantially maintained.

It is yet another object of the invention to provide means rendering the possibility of creating inexpensive and new articles of metal or wire mesh having incorporated therein slide fasteners for coupling and uncoupling abutting ends of the wire mesh.

Still a further object of the invention is to provide means reducing production cost of wire mesh structures of the aforesaid character to a minimum, which structures include slide fastener elements in directly applied condition, whereby a strong, durable, efficient and conveniently operable slide fastener construction in connection with a metal carrier is obtained whose flexibility is substantially not impaired and is useful for many industrial purposes.

These and other objects of the invention will be pointed out in the following description and claim and illustrated in the accompanying drawing which discloses, by way of example, the principle of the invention and preferred modes which have been contemplated for applying said principle.

In the drawing:

Fig. 1 is a top plan view of a piece of wire mesh of any predetermined configuration having fastener elements attached at opposite edges thereof (only a few fastener elements being shown);

Fig. 2 illustrates a top plan view of a piece of wire mesh folded upon itself with the outer edges in position adjacent each other and with the fastener elements in engagement with each other

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(part of the folded over wire mesh being broken away);

Fig. 3 illustrates a top plan view of a fastener element made in accordance with this invention;

Fig. 3A is a fragmentary, sectional view taken along line 3A—3A of Fig. 1;

Fig. 4 shows an end view in section of two fastener elements placed adjacent each other and with the wire mesh in folded over condition;

Fig. 5 shows a piece of wire mesh similar to that of Fig. 1 with fastener elements attached to opposite edges thereof and illustrating steps of the process contemplated by this invention;

Fig. 6 is a fragmentary, cross-sectional view taken along line 6—6 of Fig. 5;

Fig. 7 shows a cross-sectional view similar to that of Fig. 6, but in modified form;

Fig. 8 illustrates a top plan view of a piece of wire mesh in folded condition and with the fastener elements in locked or engaged position, similar to the structure shown in Fig. 2 but in modified form.

Referring now more particularly to the drawing, there is disclosed in Fig. 1 a piece of fine wire mesh or meshy structure 10 of any suitable configuration having the opposite side edges 11 and 12. The thickness of this wire mesh piece 10 is relatively small as it is usual, for example, in the watch metal strap industry, the wire mesh being easily and readily bendable or foldable along respective fold lines 13, 14, as indicated in Fig. 1 and more clearly seen in Figs. 2 and 4.

In accordance with the present invention, slide fastener elements 15 of the type shown in Fig. 3 may be attached to edges 11 and 12, respectively, in staggered relation, so that e. g. fastener element 15a comes to lie between fastener elements 15b and 15c, in closed or engaged position of said fasteners, as it is well known in the art. Each of the fastener elements has two prongs 16, 17 as indicated in Fig. 3, the inner faces of the latter being provided with extremely thin layers or coatings 18, 19 of solder or of any other known low melting bonding substance which is capable of retaining metal fastener elements on the metal mesh piece 10. The latter may be made of copper, silver or any suitable alloy which can be easily shaped and is sufficiently pliable so as to follow any movements e. g. of the arm of the wearer of the metal strap and like article.

The fastener elements may be attached in position along the respective edge portions 11, 12 of the metal mesh piece 10 by means of a clamping device 20 which is preferably electrically heated, as by high frequency or induced electric currents (Fig. 3A), whereby the respective layers 18, 19 of a soft solder or other metal binder having a low melting point will cause a local connection of the respective fastener elements with the upper and lower surfaces of the wire mesh 10 at predetermined locations of edge portions 11, 12.

It is well understood that the fastener element 15 contemplated by this invention is otherwise of conventional design and need not further to be described in greater detail.

Fig. 5 discloses steps of the invention in a somewhat modified form. Wire mesh 30 has the side portions 31, 32 along which extend offset solder or like bonding seams 33, 34 on the upper surface 35 as well as underface 36; whereby e. g. fastener element 40 having the prongs 37, 38 and respective circular recesses 39 therein may be placed astride said upper and lower solder seams so that such recesses are aligned with said seams for connection with the wire mesh 30 by clamping or bending prongs 37, 38 thereagainst and into contact with said seams and under the influence of electric heat treatment, as may be visualized from Fig. 3A in conjunction with Fig. 6, which shows the result of the bonding step between element 40, seams 34 and respective edge portions of wire mesh 30. Fig. 6 illustrates in section how seam 34 on upper and lower surfaces 35, 36 of edge 32 is enclosed within recess 39 of the legs or prongs of the fastener element 40.

Fig. 5 shows certain further steps according to which those portions of the offset seams 33, 34, such as designated by numeral 41a and positioned between fastener element 40a, 40b affixed onto the wire mesh 30, have been removed (by mechanical or other known means), whereby a free space 41 is obtained intermediate said adjacent fastener elements. Thus, the pliability of the wire mesh structure 30 is substantially maintained.

Fig. 8 shows the wire mesh 30 in folded condition with fold lines 42, 43 forming the side edges, while fastener elements 40a, 40b, 40c are shown in locked position and having the free space 41 therebetween.

Fig. 7 illustrates fastener element 50 affixed to edge 31' of wire mesh 30' at the free end of which there is deposited a substantially flat seam 51 extending along the upper surface 35' and lower surface 36' of wire mesh 30'. The lateral extent of seam 51 is substantially reduced in size as compared with seams 33, 34 of Figs. 5 and 6 so that also shorter fastener elements 50 may be utilized having the prongs 52 and 53 and the recess 54. Seam 51 substantially corresponds in shape and extent to said recess 54 as seen in Fig. 7. It is well understood that fastener element 50 will be connected by means of a clamping and electric heating device (similar to that shown in Fig. 3A) to the seam 51 and wire mesh 30' and that intermediate portions of the seam 51 may be removed (either by heat treatment or mechanically) and in the same manner as set forth with respect to the embodiment of Fig. 5 so that the wire mesh structure carrying the fastener elements remains substantially pliable and flexible.

The removal of superfluous solder or bonding substance forming the aforementioned seams 33, 34 or 51 and extending intermediate adjacent fastener elements may be achieved in any known manner, e. g. by means of heat and/or solvents.

It will be self-understood that instead of heating the prongs of the fastener elements, heat treatment may be applied to the wire mesh structure, while the fastener elements are supplied to the latter for position thereon in spaced apart relation by any known and suitable ma-

chine for producing and/or applying slide fastener elements to a carrier.

It is further to be observed that the pressure to be exerted on the prongs of said slide fastener elements in the direction of said wire mesh structure is only sufficient to straighten out the prongs for contact with the edge of the wire mesh structure without distorting or damaging the latter.

It is to be noted that it is also contemplated according to the invention to interconnect by means of separable fastener elements the aforesaid wire mesh structure and any known flexible structure made of fabric, leather or the like for various industrial purposes.

It can thus be seen that there has been provided according to the invention process and means for attaching separable fastener elements in spaced relation to each other, each equipped with prongs, along opposite surfaces of edge portions of a wire mesh structure by interposing metallic bonding means between said prongs of each fastener element and said edge portions of said wire mesh, bending said prongs of said fastener elements into contact with said edge portions of said wire mesh structure, applying heat to said bonding means to thereby cause said metallic bonding means to connect said fastener elements onto said edge portions of said wire mesh, and finally removing bonding means positioned intermediate adjacent and spaced apart fastener elements to substantially maintain flexibility of said wire mesh structure.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent, is:

The process of attaching along an edge portion of a wire mesh structure fastener elements, each equipped with a pair of prongs which are provided with recesses in adjacent faces of said prongs, which consist in depositing on both the upper and lower surfaces of said edge portion a seam of solder material corresponding approximately to the dimension of the recesses of said prongs of said fastener elements, placing said fastener elements in spaced apart relation to each other with their prongs astride said edge portion and said seam, aligning said recesses with said seams, and applying pressure and heat to said prongs to bend them into contact with said seams and wire mesh structure to bond said fastener elements to said edge portion of said wire mesh structure.

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