Sept. 4, 1945. M. VOITY ET AL 2,384,145

METHOD, BLANK, AND MEANS FOR MAKING SLIDERS FOR SLIDE FASTENERS

Filed June 6, 1942

Fig. 2.

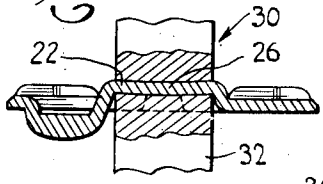


Fig. 1.

Fig. 3.

Fig. 4.

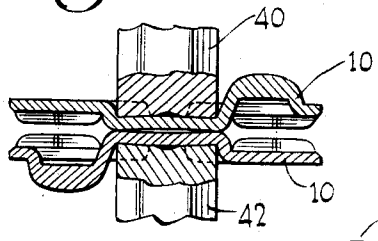


Fig. 5.

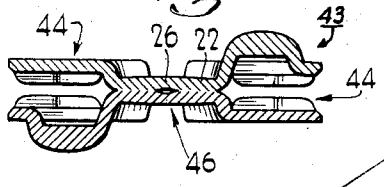


Fig. 6.



Fig. 8.

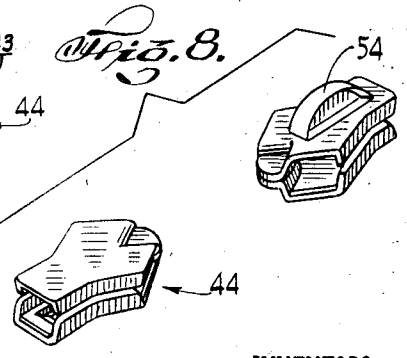
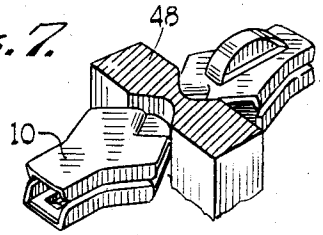


Fig. 7.



INVENTORS
MAURICE VOITY AND
GEORGE A. GRIFFITHS
BY
ATTORNEY

UNITED STATES PATENT OFFICE

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METHOD, BLANK, AND MEANS FOR MAKING SLIDERS FOR SLIDE FASTENERS

Maurice Voity, Long Island City, and George A. Griffiths, Kew Gardens, N. Y., assignors to Universal Slide Fastener Co. Inc., Long Island City, N. Y., a corporation of New York

Application June 6, 1942, Serial No. 446,063

6 Claims. (Cl. 29—148)

This invention relates to a method and means for making sliders for slide fasteners. More particularly, the invention is concerned with the formation of sliders from pairs of slider wings having integral, raised attaching portions which are integrally connected by a link, the attaching portions of one pair of wings being welded to the attaching portions of another pair of wings.

It is an object of this invention to provide a pair of slider wings of the character described, and a method and means for making the same in which the attaching portions and intermediate connecting links are so configured and arranged that said attaching portions can be welded with exceptional ease and economy to form sliders having unusually strong welded neck joints.

Other objects of this invention will in part be obvious and in part hereinafter pointed out.

The invention accordingly consists in the features of construction, combinations of elements, and arrangement of parts which will be exemplified in the construction hereinafter described, and of which the scope of application will be indicated in the claims.

Certain features of the apparatus and method herein shown or described but not claimed are shown, described and claimed in our copending application Serial No. 426,694, for Method and means for making sliders for slide fasteners, filed January 14, 1942, of which the present application is a continuation-in-part.

In the accompanying drawing, in which is shown one of the various possible embodiments of this invention and in which like numbers refer to like parts,

Fig. 1 is a perspective, partly schematic view showing successive operations in the manufacture of a pair of connected slider wings in accordance with our invention;

Fig. 2 is a vertical section through the dies used to shape the attaching portions and connecting link of a pair of connected slider wings;

Fig. 3 shows top and bottom perspective views of pairs of connected slider wings;

Fig. 4 is a vertical section through two pairs of connected slider wings positioned between two welding electrodes;

Fig. 5 is a similar view of said pairs of slider wings after performance of the welding operation has been completed to fabricate a slider blank;

Fig. 6 is a bottom view of the upper welding electrode shown in Fig. 4;

Fig. 7 is a perspective, schematic view showing the operation of separating connected pairs of sliders in a slider blank; and

Fig. 8 shows in perspective a pair of separated finished sliders.

Referring now to the drawing, and more particularly to Fig. 1, S denotes a long strip constructed in accordance with our invention and comprising a plurality of integrally connected slider wings 10, each having a flat body portion 12. A pair of parallel rail portions 14 are disposed at one end 16 of the slider body and outwardly diverging portions 18 contiguous with the parallel rail portions 14 run toward the other slider end 20. At this latter end 20 there is provided a raised attaching portion 22 which, in a completed slider will serve both as part of the neck joining two slider wings and as part of the camming surface for engaging and disengaging the elements of a slide fastener. Successive slider wings 10 are disposed along the length of the strip S with the rail portions 14 parallel to the longitudinal axis of the strip and with successive slider wings oppositely oriented. By virtue of this orientation, pairs 24 of slider wings are formed which have their attaching portions 22 adjacently disposed. These adjacent portions are integrally connected by a link 26 of a width no greater than the maximum width of the attaching portions 22 to provide a diamond-shaped bridge B between the bodies 12 of each pair 24 of slider wings. Links 28 integrally attach pairs 24 of slider wings to each other.

In accordance with our invention, the diamond-shaped bridge B, comprising the adjacent attaching portions 22 and connecting link 26 has a unique relief which is such that the elevation of the connecting link 26 is lower than the maximum elevation of the attaching portions 22 and is preferably such that each of said attaching portions slope gradually from points of maximum elevation adjacent the ends of the bridge B to said connecting link. This contour may be imparted to the bridge at the time it is originally formed. Alternatively this contour may be imparted after the bridge has been shaped and raised by a pair of relatively reciprocal dies 30 and 32 (Figs. 1 and 2).

Although we have shown the bridge as having an arcuate, concave contour, it will be understood that other elevational profiles may be employed. For example, the two attaching portions may slope linearly downward to a horizontal, flat connecting link, or the two attaching portions may slope linearly downward and the connecting link may comprise two linearly sloped portions

each one of which is a continuation of one of the linearly sloped attaching portions.

By way of illustration, and without in any way limiting the invention to the following dimensions, it may be mentioned that highly satisfactory results have been secured where the difference in elevation between the highest points of the attaching portions 22 and the lowest point of the integrally connecting link 26 is from about 0.010 to 0.015 inch. However, for clarity of illustration, the relatively slight depression of the center of the bridge B has been exaggerated throughout the drawing.

Pairs 24 of attached slider wings 10 having connecting bridges B, shaped as above described, are detached from the strip S by a reciprocating shearing tool 34 which cooperates with an aperture 36 in an anvil 38. Sets of two pairs 24 of connected slider wings are then arranged, as shown in Fig. 3, with the bridges B registered and opposed. The wings are then brought together to abut the points of maximum elevation and are placed between a pair of welding electrodes 40 and 42, whose tips are negatively shaped to match the profile of the back surfaces of the bridges B. The central portions B of said electrode tips, however, which overlie and underlie the links 26 are relieved so that both welding pressure and current are localized at the attaching portions 22. The transverse section of said electrodes is such that the end portions A correspond in contour to the outline of the attaching portions while the central relieved portions B may be of any shape (Fig. 6). The electrodes are supported and supplied with electric current in any suitable manner well known to the art.

The amount of current, degree of pressure, and duration of the welding interval are so controlled that only the attaching portions 22 of the opposed slider wings 10 are weldedly connected while the opposed links 26 are left substantially unattached. By welding in this manner, that is, from the points of maximum elevation on the two adjacent attaching portions 22 progressively inward towards the attaching link 26, the slider wings 10 are connected with an unusually strong and rigid joint which offers a high degree of resistance toward and bending strain which might tend to angularly spring the slider wings apart. Also, by keeping the welding area down to an absolute minimum and progressively welding in the manner described, the amount of electric power consumed is appreciably reduced.

As a result of the welding operation a slider blank 43 is formed comprising a pair of sliders 44 integrally connected by a link 46. To cut away this link and separate said sliders, there is employed a specially shaped shearing tool 48 which cooperates with an anvil (not shown). At the time the sliders 44 are separated, sizing tools (not shown) may be inserted to properly position the wings 10.

It will be appreciated that the shape and incidental construction of the slider wings 10, apart from the attaching portions 22, will be controlled by the desired shape of the slider and the equipment to be used therewith. For example, it will be seen that chamfered edges 50 and V-shaped grooves 52 on the slider wings 10, while they are still an integral part of the strip S, provide correspondingly beveled edges on the finished sliders 44 (Fig. 8). Also alternate slider wings disposed along the strip may have bails 54 formed thereon so that tabs may be attached to the finished slider.

It will thus be seen that there is provided an apparatus and method for making the same in which the objects of this invention are achieved, and which are well adapted to meet the conditions of practical use.

As various possible embodiments might be made of the above invention, and as various changes might be made in the embodiment above set forth, it is to be understood that all matter herein set forth or shown in the accompanying drawing is to be interpreted as illustrative and not in a limiting sense.

Having thus described our invention, we claim as new and desire to secure by Letters Patent:

1. In a method of making sheet metal sliders of the character described, the steps of first forming pairs of completely fashioned slider wings with rails, adjacently disposed raised attaching portions, and an integral connecting link which is the sole element between said attaching portions, the attaching portions and connecting links being so relieved that the surfaces of said attaching portions and links on the same side of the wings as the rails slope in a direction opposite to that in which the rails extend from a point of maximum elevation on each of said pair of attaching portions to a point of minimum elevation at the intermediate link; arranging said pairs in sets of two with the rails opposed, the points of maximum elevation of the attaching portions in opposition, abutment and registration, and the links in opposition and registration and spaced from each other; welding together only said attaching portions to form pairs of completely fashioned integrally connected sliders with the links unconnected; and separating said sliders from each other at said links to provide completely fashioned sliders requiring no further forming operations.

2. In a method of making sheet metal sliders of the character described, the steps of first forming pairs of completely fashioned slider wings with rails, adjacently disposed raised attaching portions, and an integral connecting link which is the sole element between said attaching portions, the attaching portions and connecting links being so relieved that the surfaces of said attaching portions and links on the same side of the wings as the rails slope in a direction opposite to that in which the rails extend from a point of maximum elevation on each of said pair of attaching portions to a point of minimum elevation at the intermediate link; arranging said pairs in sets of two with the rails opposed, the points of maximum elevation of the attaching portions in opposition, abutment and registration, and the links in opposition and registration and spaced from each other; welding together only said attaching portions to form pairs of completely fashioned integrally connected sliders with the links unconnected; and then shearing away said unconnected links to separate said sliders from each other and provide completely fashioned sliders requiring no further forming operations.

3. In a method of making sheet metal sliders of the character described, the steps of first forming pairs of completely fashioned slider wings with rails, adjacently disposed raised attaching portions, and an integral connecting link which is the sole element between said attaching portions, the attaching portions and connecting links being so relieved that the surfaces of said

attaching portions and links on the same side of the wings as the rails slope in a direction opposite to that in which the rails extend from a point of maximum elevation on each of said pair of attaching portions to a point of minimum elevation at the intermediate link; arranging said pairs in sets of two with the rails opposed, the points of maximum elevation of the attaching portions in opposition, abutment and registration, and the links in opposition and registration and spaced from each other; progressively welding together said opposed attaching portions from points spaced away from said link up to but not through said spaced links to form pairs of completely fashioned integrally connected sliders with the links unconnected; and separating said sliders from each other at the links to provide completely fashioned sliders requiring no further forming operations.

4. For use in a method of manufacturing sheet metal sliders of the character described from sets including two pairs of completely fashioned slider wings having rails, adjacently disposed attaching portions, and an integral connecting link, wherein the attaching portions and connecting link are so relieved that the surfaces thereof on the same side of the wings as the rails slope in a direction opposite to that in which the rails extend from a point of maximum elevation on each of said attaching portions to a point of minimum elevation at the intermediate link, and in which method the points of maximum elevation of the attaching portions are opposed, registered and abutted, and the links opposed and registered and spaced from each other; an apparatus comprising a pair of welding electrodes having tips whose cross-sections match the contour of adjacently disposed attaching portions and whose ends are indented to negatively match the configurations of the opposite surfaces of the attaching portions and link in which the point of maximum elevation is at the link and the points of minimum elevation at the attaching portions, the portions of said tips at said links being relieved to clear said links and prevent welding from occurring thereat.

5. For use in the formation of sheet metal sliders of the character described, an article of manufacture comprising a pair of completely fashioned slider wings each having rails and raised attaching portions, said wings being so relatively arranged that the attaching portions are adjacently disposed, and a link integrally connecting said attaching portions, said attaching portions and link having an elevational contour on the surface thereof on the same side of the wings as the rails such that said attaching portions and link slope in a direction opposite to that in which the rails extend from a point of maximum elevation on each of the attaching portions to a point of minimum elevation at the intermediate link whereby when pairs of wings are arranged in registration with the rails opposed, and the attaching portions then welded, the welding will be progressive from points spaced away from the links toward the links.

6. For use in a method of manufacturing sheet metal sliders of the character described from two pairs of completely fashioned slider wings having rails and attaching portions, the wings in the pairs being oppositely oriented so that the attaching portions are adjacently disposed, the attaching portions being integrally connected, and in which method the pairs are arranged with the rails opposed and the wings and attaching portions in registration; an apparatus comprising a pair of welding electrodes for simultaneously welding together the two pairs of adjacent registered attaching portions so as to complete at the same time the formation of a pair of completely fashioned sliders integrally connected at the attaching portions, said electrodes having tips whose cross section matches the contour of the pairs of adjacently disposed attaching portions.

MAURICE VOITY.
GEORGE A. GRIFFITHS.