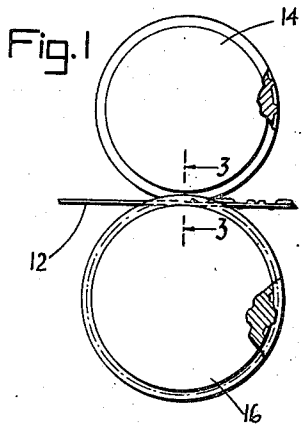
April 3, 1945. R. LOW 2,372,837

MANUFACTURE OF SLIDERS FOR SLIDE FASTENERS

Filed Sept. 27, 1941 2 Sheets-Sheet 1

Fig. 1



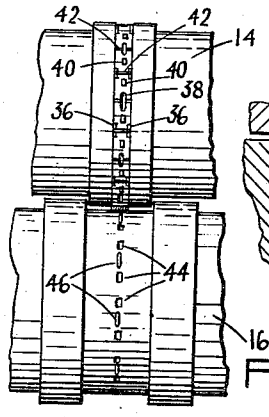


Fig. 2

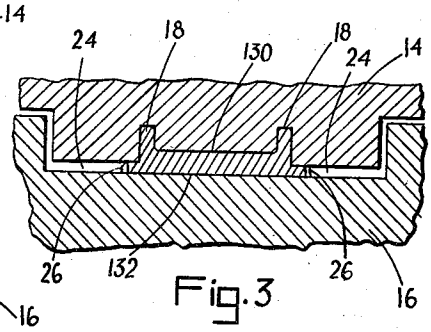


Fig. 3

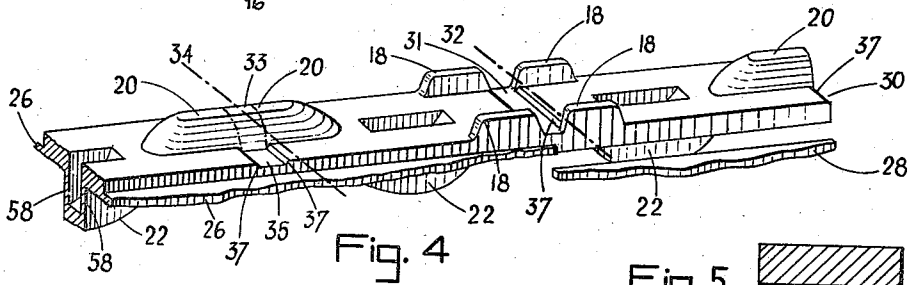


Fig. 4

Fig. 5

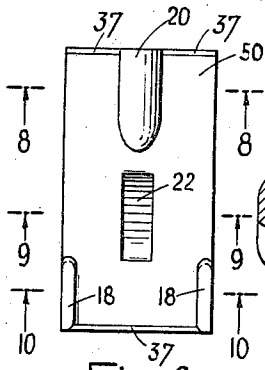


Fig. 6

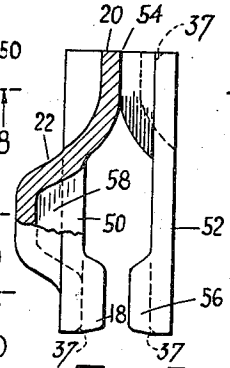


Fig. 7

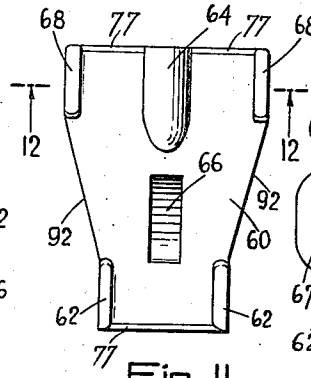


Fig. 11

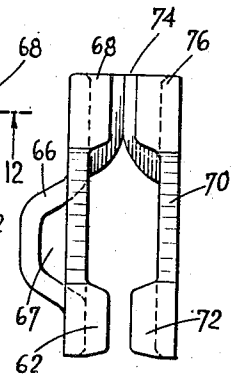


Fig. 13

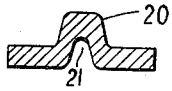


Fig. 8

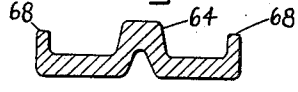


Fig. 12

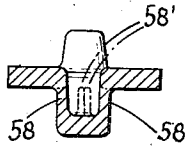


Fig. 9

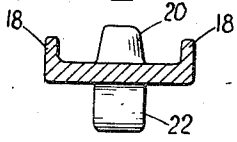


Fig. 10

INVENTOR
RICHARD LOW
BY
ATTORNEYS

April 3, 1945. R. LOW 2,372,837

MANUFACTURE OF SLIDERS FOR SLIDE FASTENERS

Filed Sept. 27, 1941 2 Sheets-Sheet 2

Fig. 14

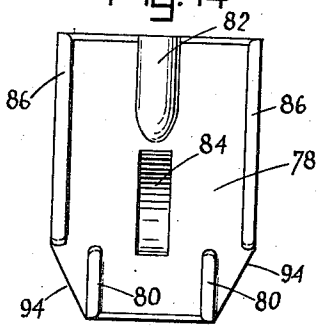


Fig. 15

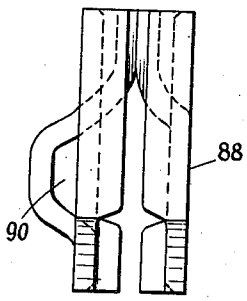


Fig. 16

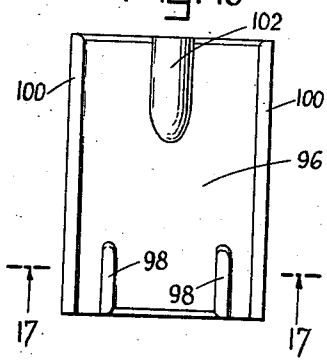


Fig. 18

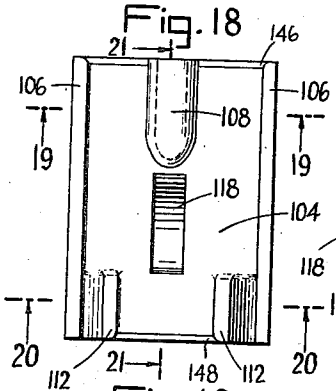
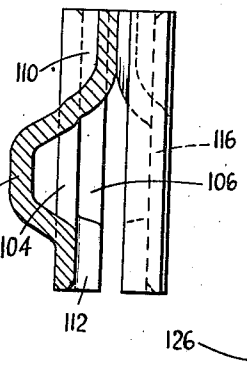


Fig. 21



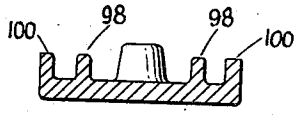


Fig. 17

Fig. 19

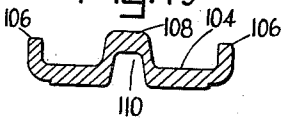


Fig. 23

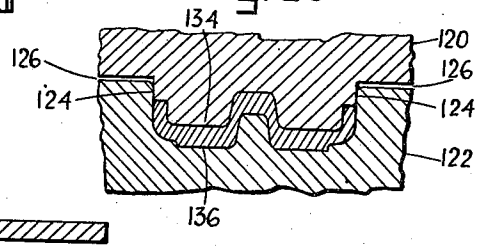
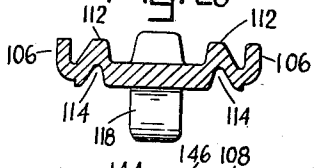


Fig. 20



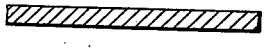


Fig. 22

Fig. 24

INVENTOR
RICHARD LOW

BY James & Franklin

ATTORNEYS

Patented Apr. 3, 1945

2,372,837

UNITED STATES PATENT OFFICE

2,372,837

MANUFACTURE OF SLIDERS FOR SLIDE FASTENERS

Richard Low, Newark, N. J., assignor to Conmar Products Corporation, Newark, N. J., a corporation of New Jersey

Application September 27, 1941, Serial No. 412,564

4 Claims. (Cl. 29—148)

This invention relates to the manufacture of sliders for slide fasteners.

The primary object of the invention is to generally improve the manufacture of slide fasteners. A more particular object is to speed up and cheapen the manufacture of sliders by rolling a continuous wire between pressure rolls and thereby deforming said wire to provide projections corresponding to flanges, a neck portion, and a lug portion, said projections being formed in a continuous repetitive series along the wire. The wire is preferably deformed in a single passage through a single pair of rolls. Thereafter the rolled wire is severed into relatively short pieces corresponding to individual sliders.

A further object is to facilitate the rolling operation, and for this purpose the projections formed on the strip preferably extend only longitudinally of the strip and in parallel relation. As a specific example, the slider is preferably devoid of diagonal projections for the usual diagonal flanges.

A further object of the invention is to make the rolled slider a locking slider, this being done by the provision of parallel locking flanges at the upper end of the slider in addition to the parallel fastener-closing flanges at the lower end of the slider. To stiffen and rigidify the slider the more widely spaced locking flanges may, if desired, be extended for substantially the entire length of the slider.

In accordance with further objects of the invention, the slider may be made either by coining a relatively thick material to form the projections while reducing the material to the desired thickness of the slider wall, or by running a thinner material through the pressure rolls, said material having a thickness corresponding to the desired slider wall thickness, and the metal of said wire being bent at the side edges and indented at intermediate points to form the desired projections. In either case, and particularly the former case, excess metal may be extruded outwardly in the form of fins extending along the side edges of the rolled wire, and these may be subsequently trimmed from the wire. In the latter case, however, the total cross-section area of the deformed wire at different points along the wire may be kept substantially constant, and at the same time the wire is preferably confined, so as to avoid the formation of fins at the side edges.

To accomplish the foregoing objects, and such other objects as will hereinafter appear, my invention consists in the method and slider elements and their relation one to the other as hereinafter are more particularly described in the specification and sought to be defined in the claims. The specification is accompanied by drawings, in which:

Fig. 1 is a partially sectioned end elevation of a pair of rolls operating on a strip of material to form embryo slider walls;

Fig. 2 is a front elevation of the same;

Fig. 3 is a fragmentary section through the wire at the rolls, drawn to enlarged scale;

Fig. 4 is a perspective view showing the rolled strip;

Fig. 5 is a section through the original material or wire from which the strip of Fig. 4 is made;

Fig. 6 is an elevation looking at the inside of a front slider wall;

Fig. 7 is a partially sectioned side elevation of a slider using the wall of Fig. 6;

Fig. 8 is a transverse section taken in the plane of the line 8—8 of Fig. 6;

Fig. 9 is a transverse section taken in the plane of the line 9—9 of Fig. 6;

Fig. 10 is a transverse section taken in the plane of the line 10—10 of Fig. 6;

Fig. 11 shows the inside of a front slider wall for a locking slider;

Fig. 12 is a transverse section taken in the plane of the line 12—12 of Fig. 11;

Fig. 13 is a side elevation of a slider using the front wall shown in Fig. 11;

Fig. 14 shows the inside of a front slider wall for a modified locking slider;

Fig. 15 is a side elevation of the said modified slider;

Fig. 16 shows the inside of the back wall of a modified locking slider;

Fig. 17 is a transverse section taken in the plane of the line 17—17 of Fig. 16;

Fig. 18 is a rear elevation of the front wall of still another modified locking slider;

Fig. 19 is a transverse section taken in the plane of the line 19—19 of Fig. 18;

Fig. 20 is a transverse section taken in the plane of the line 20—20 of Fig. 18;

Fig. 21 is a partially sectioned side elevation of a slider embodying the front wall shown in Fig. 18;

Fig. 22 is a transverse section through the material used for making the slider of Figs. 18 through 21;

Fig. 23 is a transverse section showing the deformation of the material in the rolls; and

Fig. 24 is a perspective view showing the rolled strip.

Referring to the drawings, and more particularly to Figs. 1 and 2, I there show schematically how a metal strip or wire 12 is fed between pressure rolls 14 and 16, said rolls operating to deform the wire in a single passage through the rolls to the configuration shown in Fig. 4. In Fig. 4 the rolled strip has projections 18 corresponding to side flanges, projections 20 corresponding to neck portions, and projections 22 corresponding to lugs for carrying a pull or finger piece. The wire stock may be initially of considerable thickness, as is indicated by the cross-section shown in Fig. 5. The thickness of the stock is preferably equal to the desired wall thickness plus the desired flange. Thus the main operation of the rolls is to so strongly compress the wire as to reduce it in thickness from the initial thickness shown in Fig. 5 to the desired wall thickness shown in Figs. 3 and 4. During this operation, the projections are coined upwardly or downwardly from the stock being rolled.

Any excess metal is squeezed sidewardly into the space 24 (Fig. 3) between the rolls 14 and 16, thereby forming fins 26 extending along the edges of the wire. The fins may be trimmed from the wire as one stage in the operation of a die which finishes the manufacture of the slider walls. This is illustrated in Fig. 4 by the punching away of the fin section 28 corresponding to one slider wall.

The die further severs the rolled wire into relatively short pieces corresponding to individual slider walls. In Fig. 4 the last cut took place at the end 30, the next cut will take place at the broken line 32, and the next cut will take place at the broken line 34. It will be noted that the cuts 30 and 34 are through the neck projections 20, while the cut 32 is between the flanges 18. Thus the projections are formed in a repetitive series along the wire, but the successive slider walls are reversed end for end, so that the successive slider walls are arranged neck to neck, and flange to flange.

A part of the wire is punched away for the desired cut. In the present case the part that is punched away between the flanges 18 is indicated at 31, while the part that is punched away betweeen neck portion 20 is indicated at 33. The flat wall is preferably indented by the rolling operation, as is indicated at 31 and 35, in order to provide beveled edges 37 for the finished slider.

In Fig. 4 it is assumed that the entire strip is being used for the manufacture of front slider walls, each such wall being provided with a lug 22 for receiving the pull of the slider. It will be understood that a similar strip is manufactured but without the lugs 22, the latter strip being similarly severed into short lengths to provide back slider walls. These back slider walls may be identical with the front slider walls in every respect except for the omission of the lugs 22.

The rolls 14 and 16 are, of course, designed to be negative to the desired impressions on the wire. Specifically, the recesses 36 correspond to flanges 18. The recesses 38 correspond to the neck portions 20. The projections 40 correspond to the inside of the lugs 22. The projections 42 form the indentations 31 and 35 together with the bevelled edges 37. The recesses 44 in roll 16 correspond to the lugs 22. The projections 46 correspond to the inside of the neck portions 20.

The particular wire produced by the rolling operation so far described is for a simplified slider which is illustrated in Figs. 6 through 10 of the drawings. It comprises a front slider wall 50 (Figs. 7) and a rear slider wall 52 secured together at the neck portion 54, as for example, by welding the projections 20 together. The front and rear walls have parallel flanges 18 and 56 at their lower ends, and the front wall 50 has the lug 22 on its outer face. It will be understood that the side walls 58 (Figs. 4, 7, and 9) of the lug 22 are indented inwardly by a die operation, subsequent to the rolling operation, as is indicated by the broken lines 58' in Fig. 9, thus forming recesses for receiving the pivots of the pull.

The neck portion 20 is indented at 21, as is best shown in Fig. 8. The projections for this purpose are shown at 46 in Fig. 2. This feature is optional however, and the neck may if desired, be made solid. In such case, however, the raw wire stock (see Fig. 5) is preferably thicker, so as to equal or even exceed the thickness of the slider wall plus the thickness of the solid neck.

In accordance with a feature of the present invention, the projections all extend longitudinally of the wire and parallel to one another. This facilitates the rolling operation, it being simpler and easier to roll a projection extending in the direction of rolling than a diagonal projection. For this and other reasons the slider shown in Figs. 6 through 10 is simplified by omitting the usual diverging flanges. The parallel flanges at the lower end of the slider are adequate to close the slide fastener. The neck projection 20 at the upper part of the slider is sufficient to open the slide fastener. Thus the simplified slider shown is adequate for most purposes, the diverging flanges being unnecessary except when dealing with slide fasteners which must be repeatedly closed against a load constantly pulling the stringers of the slide fastener apart during the closing operation.

If desired, additional flanges may be provided to form a locking slider. This is illustrated in Figs. 11 through 13, in which the front wall 60 of the slider is provided with parallel flanges 62 at its lower end for closing the slide fastener, a neck portion 64 at its upper end for opening the slide fastener, a lug 66 for carrying the pull, and flanges 68 at its upper end for locking the slide fastener against unintended opening. The parallel locking flanges 68 are disposed further apart than the slider-closing flanges 62, the difference in spacing corresponding roughly to the width of the neck portion 64. The locking flanges 68 are useful not only in preventing unintended opening of the slider, but also in providing a smoother action for the closing flanges 62, as they help make up for the omission of the conventional diverging flanges.

The back wall 70 of the slider has bottom flanges 72 (Fig. 13) corresponding to the front bottom flanges 62, a neck portion 74 corresponding to the front neck portion 64, and top flanges 76 corresponding to the top flanges 68. The back wall may be identical with the front wall except for the omission of the lug 66.

In Fig. 13 the side walls of the lug 66 are indented at 67, the slider being assumed finished except for the addition of a pull, not shown.

The outer ends of the locking flanges may be left square or may be sloped. In the latter case they may be rolled separately with a space therebetween (like the flanges 18 in Fig. 4). In the former case they may be rolled continuously and severed (like the necks 20 in Fig. 4). In either

case indentations for bevels 77 are preferably provided.

If desired, the parallel locking flanges may be carried downwardly for substantially the entire length of the slider. Such a construction is illustrated in Figs. 14 and 15, in which it will be seen that the front wall 78 is provided with bottom or closing flanges 80, a neck portion 82, a lug 84, and locking flanges 86, the latter extending down to a point opposite the upper ends of the slider-closing flanges 80. The back wall 88 is similar to the front wall 78, except for the omission of the lug 84. In Fig. 15 the sides of the lug are shown indented at 90, as is the case in a finished slider.

The modification of Figs. 14 and 15 has the advantage of stiffening and strengthening the slider walls. This is to be contrasted with the slider of Figs. 11–13, in which the middle part 92 of the slider wall intermediate the end flanges is not rigidified by flanges. Of course, even the arrangement of Figs. 11–13 is useful and satisfactory because the metal is hardened by the "working" when passing through the coining rolls. It will be observed that in all cases the projections extend longitudinally of the strip and parallel to one another. The diagonal edges of the slider walls shown at 92 in Fig. 11 and at 94 in Fig. 14, are produced as a part of the die-cutting or stamping operations which follow the rolling operation.

In Figs. 16 and 17 I show the back wall of a modified slider in which the side flanges extend for the entire length of the slider. Specifically, the wall 96 has bottom flanges 98 for closing the slide fastener, and top flanges 100 for locking the slider. The top flanges 100 extend for the entire length of the slider, thereby further strengthening and rigidifying the slider wall, as well as improving its appearance for certain purposes. The neck portion 102 may be like those previously described. The front wall of the slider is identical with the back wall of the slider except for the provision of a lug for carrying the pull. This slider wall, like those previously described, is assumed to have been rolled from initially thick stock, any excess thickness forming marginal fins which are subsequently trimmed away. Thus the description of Fig. 4 is applicable, except, of course, that in the later examples, the fin will be formed outside the outer flanges, instead of outside the inner flanges.

Instead of coining solid projections out of thick stock, it is also possible to employ a wire or strip of metal which is initially thinner and wider, it preferably having a thickness corresponding to the desired thickness of slider wall. The side flanges are formed by displacing the stock inwardly, and the center projections are formed by indenting the material at the opposite face of the slider wall.

Such a slider is shown in Figs. 18 through 21, referring to which it will be seen that the front slider wall 104 has its side edges formed into the locking flanges 106. In the specific case here shown, these are carried down for the entire length of the slider. The neck portion 108 has an inside configuration like that previously described, but differs in that the outer wall is farther indented, as is indicated at 110 in Fig. 19. In this case the indentation at the neck is essential to its formation. In Figs. 8 and 12, etc., the indentation is not essential to its formation.

The inner flanges 112 are also produced by indenting the outer wall of the slider, as is indicated at 114 in Fig. 20. The back wall 116 (Fig. 21) is identical with the front wall 104, except that it is not provided with the lug 118. In the previous modifications of the invention, the lug was hollowed on the inside, primarily with a view to facilitating indentation of its side walls to receive the pull. In the present form of the invention, the lug is hollowed not only for that reason, but also in order to provide material to form the lug, it being remembered that the initial thickness of the material corresponds only to the slider wall thickness.

A section through the stock employed, is illustrated in Fig. 22, and is to be contrasted with the narrower, thicker stock shown in Fig. 5.

The manner in which this thin stock is treated by the rolls is illustrated in Fig. 23, showing a section through the stock corresponding to the section of Fig. 19, but also showing fragmentary portions of the upper and lower rolls 120 and 122. In the present design, the cross-section area of the rolled strip is preferably kept uniform at all points along the strip, and the metal may in such case be confined with a view to avoiding the formation of a fin. This is illustrated in Fig. 23, in which it will be seen that the amount of metal available is barely sufficient to fill the impression of the rolls, and there is no excess to form a fin. In order to provide a closed cavity between the rolls, they preferably contact at vertical sliding surfaces 124. This permits a space 126 to be left between the rolls, which is desirable because at the point 126 the peripheral speeds may differ. This is so because the linear speed of the rolls is identical only at the pitch line, which, of course, is somewhere in the body of the slider rather than at the point 126, the latter being offset substantially from the pitch line.

In this connection it may be pointed out that the rolls are preferably so designed as to locate the pitch line midway between the top and bottom of the single largest and most representative cross-section area of the slider. Thus in Fig. 3, the pitch line is preferably disposed half-way between the surfaces 130 and 132. In Fig. 23, the pitch line is preferably disposed about half-way between the surfaces 134 and 136, with any departure from the mid-point being in the upward direction, as more metal is disposed above than below the slider wall.

The strip which is obtained from the rolls in accordance with the foregoing instructions is illustrated in perspective in Fig. 24. The rolled strip has the side flanges 106, the neck projection 108, the lug 118, and the inner flanges 112. The roller strip is subsequently cut at the broken lines 140, 142, 144, etc. Thus a part of the strip is punched away mid-way out of the neck projection 108 and of the inner flange projection 112, the projections being more than twice the desired length for a single slider wall. However, in the present case, the arrangement differs substantially from that shown in Fig. 4, in that the lugs 118 are provided only for alternate slider walls. Thus the strip is made up of a front slider wall, followed by a back slider wall, followed by a front slider wall, and so on, in alternation. This arrangement has the advantage of insuring perfect control of the manufacturing process, in that an equal number of front and back walls is made, these being made of identical material having identical characteristics. These slider walls are reversed end for end in order to bring the neck portions together and the flange portions together. This has the advantage previously pointed out in connection with Fig. 4, and the further

advantage of making it possible to form the sliders of double-length blanks by cutting entirely through the material on only the broken line 142 and not at the lines 140 and 144, the double-length blank then being folded at the neck to bring the front and back walls into parallel superposition. At 140 and 144 the metal is punched away on both sides oaf the neck 108, but not through the neck itself. The resulting slider may, of course, be additionally welded at the neck if it is desired to strengthen the walls against separation.

In all cases the metal is preferably indented during the rolling operation to provide the desired bevel edges 146 and 148.

It will be understood that while I have shown only one form of slider made by the second process, that is, using thin stock which is bent to configuration instead of thick stock which is coined to configuration, other sliders may be made by the second process. However, I consider this slider with locking flanges extending entirely along its length to be a preferred form of slider, because of the characteristics and the appearance of the finished slider, as well as the convenience of manufacture by rolling, as above described.

It is believed that the improved slider manufacture of the present invention, as well as the advantages thereof, will be apparent from the foregoing detailed description thereof. The sliders may be made accurately at high speed with a minimum of labor. The non-locking slider, such as that shown in Fig. 6, has the advantage of being small and narrow in dimension, modern in appearance, and extremely economical in the use of material. The locking slider, such as that shown in Fig. 16 or Fig. 18, is an effective automatically locked slider which is stream-lined and modern in appearance.

It will be apparent that while I have described my invention in several preferred forms, many changes and modifications may be made without departing from the spirit of the invention, as sought to be defined in the following claims.

I claim:

1. In the manufacture for slide fasteners of sliders having spaced parallel walls, a neck integrally uniting said walls, and side flanges extending inwardly from said walls, the method which consists in running a wire to produce a slider strip between pressure rolls having on their peripheries projections and recesses extending substantially parallel to the run of the wire, said projections and recesses on the pressure rolls being negative to projections on the formed slider strip which define the neck portion of the slider and projections on the slider strip which define the side flanges of the slider, thereby continuously deforming said wire and forming a slider strip provided with a repetitive series of slider wall forming portions, and neck forming and flange forming projections arranged substantially in parallel relation longitudinally of the strip, the repetitive series comprising slider halves, severing the slider strip to form individual slider halves and uniting slider halves at their neck portions to form complete sliders.

2. In the manufacture for slide fasteners of sliders having spaced parallel walls, a neck integrally uniting said walls and side flanges extending inwardly from said walls, the method which consists in running a wire to produce a slider strip between pressure rolls having on their peripheries projections and recesses extending substantially parallel to the run of the wire, said projections and recesses on the pressure rolls being negative to projections on the formed slider strip which define the neck portion of the slider and projections on the slider strip which define the side flanges of the slider, there being inner flanges disposed relatively close together for fastener closing action and outer flanges disposed further apart for slider locking action, thereby continuously deforming said wire and forming a slider strip provided with a repetitive series of slider wall forming portions, and neck forming and flange forming projections arranged substantially in parallel relation longitudinally of the strip, the repetitive series comprising slider halves arranged end to end, then severing the slider strip to form individual slider halves and uniting slider halves at their neck portions to form complete sliders.

3. In the manufacture for slide fasteners of sliders having spaced parallel walls, a neck integrally uniting said walls, a lug projecting from one of said walls and side flanges extending inwardly from said walls, the method which consists in running a wire in a single passage to produce a slider strip between pressure rolls having on their peripheries projections and recesses extending substantially parallel to the run of the wire, said projections and recesses on the pressure rolls being negative impressions to projections on the formed slider strip which define the neck portion of the slider, the lug portion and the side flanges of the slider, thereby continuously deforming said wire and forming a slider strip provided with a repetitive series of side wall forming portions, and lug and neck forming and flange forming projections arranged substantially in parallel relation longitudinally of the strip, the repetitive series comprising slider halves, severing the slider strip to form individual slider halves and uniting slider halves at their neck portions to form complete sliders.

4. The method of claim 3 in which there are negative impressions on the pressure rolls producing in the slider strip two sets of parallel flanges, inner flanges disposed relatively close together for fastener closing action and outer flanges disposed further apart for slider locking action.

RICHARD LOW.