Aug. 7, 1951 W. SCHAFROTH 2,563,426

CLIP FOR FASTENING PIECES OF MATERIAL TOGETHER

Filed Aug. 5, 1949

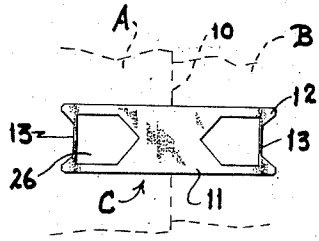


FIG. 1

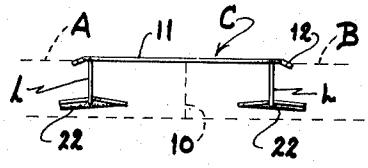


FIG. 2

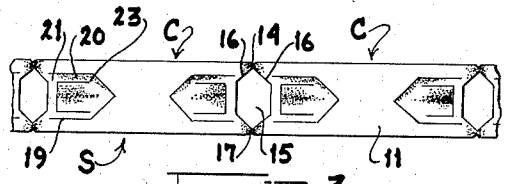


FIG. 3

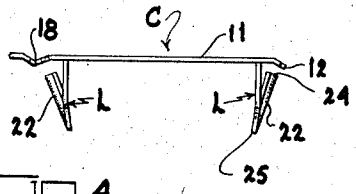


FIG. 4

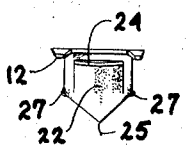


FIG. 5

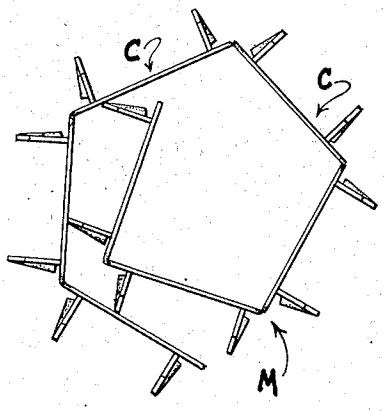


FIG. 6

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CLIP FOR FASTENING PIECES OF MATERIAL TOGETHER

Werner Schafroth, Havertown, Pa.

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8 Claims. (Cl. 85—49)

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The present invention deals with clips that are employed for the purpose of joining pieces of material together and is concerned primarily with improvements in a clip that is designed to join such elements as the flaps of a carton.

In the copending application of Werner Schafroth, filed June 10, 1948, Serial Number 32,125, entitled "Clip for Fastening Sections and/or Layers of Material," there is illustrated and described a clip of the general type which is intended to be improved by this invention.

In order to explain the exact nature of the improvements of the present invention and the advantages afforded thereby, it is necessary to refer to certain salient features of construction of the clip of said application.

Each clip is of an elongated rectangular formation and the clips are provided in a continuous strip being joined together by a small neck or tab located centrally of the clips and which is severed when a clip is struck from the strip.

Each clip comprises a main body portion which is cut away to define legs or struts that are bent downwardly into positions substantially normal to the main body portion. Each of these legs is integrally joined to the main body portion of the clip by a bend of the metal which is of a curved formation providing a curvature or a shallow curve-like structure in that portion of each leg adjacent to the main body portion. Each of these legs is formed with diagonal slots which enter thereinto from the sides and which define points or tangs. Adjacent each end each clip is formed with an opening that takes the form of an elongated slot and through which a bending tool is adapted to pass after the legs have penetrated the pieces of material which are to be joined to that point where the underface of the main body portion engages the upper surface of these pieces of material. The bending tools are driven downwardly and engage the points or tangs to bend the lower portion of each leg into a position which is substantially parallel to that of the main body portion. That is, the lower portion of each leg is bent into the form of the head of a T with the stem being constituted by the curved upper portion of the leg.

When a clip having the general characteristics above outlined is used under practical conditions, certain undesirable factors develop which are intended to be overcome by this invention. As above outlined, the clips are joined in the magazine strip by a small neck or tab of metal which must be severed when a clip is struck therefrom for use. This severing action creates a small burr which is present on the exposed faces of a carton which may be closed by the clips. Obviously, such burrs constitute a menace for subsequent handling of the cartons and there is great danger of scratching the hands of the

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person handling the carton. One of the important objects of the invention is to eliminate the possibility of the formation of such a burr on anything that would be comparable thereto.

From the practical viewpoint, it is necessary to manufacture these clips in long continuous strips. This means that they must be handled as strips up to the time each individual clip is severed and driven. With adjacent clips being joined only by a central tab or neck there is a tendency for the clips to float or weave during the various manufacturing and handling steps. Another highly important object of the invention is to eliminate this floating and weaving and to provide a strip of the clips which will positively remain in accurate alignment up to the point where a clip is struck therefrom.

As above explained each clip must be struck from the strip just prior to being driven into effective position on the pieces that are being joined. This requires the operation of a severing tool of some type, and the operation of such a tool requires an appreciable downward stroke. With the central neck or tab, the effective portions of the severing tool are located in such close juxtaposition to the area of operation of the other tools, namely, the supporting and bending instrumentalities, as to make it necessary to provide for the stroke of the severing tool as a part of the complete stroke of the machine which drives these strips and thereby lengthens the stroke.

An important object of the invention is to provide a clip which is joined to an adjacent clip in a magazine strip by metal that is so far removed from the area of operation of the supporting and bending instrumentalities as to render the stroke of the severing tool separate and independent from the strokes of the other tools. With this arrangement it is possible to have the stroke of the severing tool overlap the strokes of the other instrumentalities.

In the clip of the copending application an opening must be formed adjacent each end of each clip to accommodate the bending tool. The formation of these openings requires a die for cutting them out. Obviously, the formation of a pair of openings for each clip complicates the die construction. A further object of the invention is to provide a clip in which these small openings are eliminated and replaced by a single large opening that is formed between adjacent clips and thereby simplifies the construction of the die used in forming the clips.

Each of the foregoing objects is attained by providing a plurality of the clips in a continuous strip. Each clip is separated from the next adjacent clip by an enlarged opening extending almost entirely across the width of the strip and which opening, together with small depressions coming

in from the outer side edges, define narrow necks substantially at each side edge which join the adjacent clips. An important object of the invention is to provide, in a strip of clips of the type indicated, depressed joining necks of the character indicated. With such depressed necks the metal on each side of severance is imparted an initial angle of downward direction so that when the metal is severed, each tab formed by the severance of the neck has a downwardly directed point that is adapted to be driven into and become embedded in the exposed faces of the pieces of material being joined. Thus, any possibility of creating burrs or jagged points on the severed ends is entirely eliminated.

With the joining necks located substantially at the opposite sides of the clips, the various clips making up a strip are held in accurate alignment to facilitate manufacture and handling operations.

With the large opening between adjacent clips a recess is provided at each end of the clip for accommodating the bending tool. Thus, the die construction is simplified. Moreover, with the necks which are to be severed located close to the respective side edges, the metal is severed at locations substantially removed from the area of operation of the supporting and bending instrumentalities; thereby making it possible to shorten the stroke of the machine for driving the clips, in that the stroke for the metal severing operation may overlap the stroke of the supporting instrumentalities.

Another highly important object of the present invention is to provide a clip of the type indicated which includes a leg at each end and each of which legs comprises spaced struts. It is evident that with the same amount of metal available for each leg, a leg which comprises spaced struts will exhibit better structural characteristics than one defined by a single strut of the same amount of metal.

Still another object of the invention is to provide in a clip of the type indicated, a leg which comprises spaced struts which are integrally joined at their lower extremities to a pointed tab. This tab originally assumes a position approaching alignment with the struts and is given a curvature corresponding to a segment of a cylinder. That is, it is curved from side to side to provide a concavo-convex structure from its upper free end to the point at the lower end. It is this tab which is bent into a position substantially parallel to the main body portion of the clip to which it is joined by the legs. A tab having these structural characteristics presents the advantage of being more rigid and stronger than the corresponding structure in the clip of the aforementioned copending application. Being more rigid, it is susceptible of being bent into its ultimate holding position with definite assurance that it will assume its most efficient holding position, namely, that in which it is parallel to the main body portion.

With a clip including a tab of the type above indicated, a relatively larger holding area is provided in the tab itself as compared to the tab of the copending application. Furthermore, it makes possible the formation of a sharp point on the tab which facilitates driving. Moreover, the curved upper edge of the tab itself is adapted to be readily engaged by a single bending tool, thereby making possible the simplification of the machine for driving the clips. Being more rigid the tab is, therefore, more resistant to any tendency to becoming deformed by the resistance offered by the material into which it is driven.

Another object is to provide, in a strip of clips of the type indicated, means for preventing the clips from nesting, one within the other, when coiled into a compact magazine. This object is achieved by forming a pair of outwardly extending ears on opposite sides of each leg where the pointed tab is joined thereto.

Various other more detailed objects and advantages of the invention such as arise in connection with carrying out the above noted ideas in a practical embodiment will, in part become apparent, and in part be hereinafter stated as the description of the invention proceeds.

The invention, therefore, comprises a continuous strip of clips, each of which is adapted to be driven into pieces of material to be joined. Adjacent clips in the strip are separated by large openings extending almost from side to side of the strip with adjacent clips being joined by depressed necks which when severed provide downwardly pointed tabs. Each clip has a leg at each end assuming a position substantially normal to the main body portion of the clip. Each leg comprises a pair of spaced struts which are integrally joined at their upper ends to the main body portion of the clip with a pointed tab of concavo-convex formation integrally joined to the lower end of the struts and which tabs are adapted to be bent into a position substantially parallel to the main body portion of the clip by an appropriate tool in the driving machine which is rendered effective through the spaces provided by the openings which separate adjacent clips.

Each leg carries a pair of outwardly extending ears where the tab is joined thereto to prevent nesting when a strip of the clips is coiled into a compact magazine.

For a full and more complete understanding of the invention, reference may be had to the following description and accompanying drawing wherein:

Figure 1 is a top plan view of a clip that is applied to two pieces of material which are to be joined in accordance with the precepts of this invention. In this view the pieces of material are represented by broken lines.

Figure 2 is a view in side elevation of the clip in holding position with the pieces of material represented by broken lines.

Figure 3 is a top plan view of a portion of a continuous strip at one stage in the manufacturing process.

Figure 4 is a view in side elevation of a clip in condition for driving.

Figure 5 is an end elevation of the clip shown in Figure 4; and

Figure 6 is a side elevational view illustrating how a plurality of the clips may be wound into a coil.

Referring now to the drawing wherein like reference characters denote corresponding parts, two pieces of material to be joined are designated A and B. Obviously, these pieces might be just about any pieces of material; however, the invention has particularly in mind the joining of the flaps of cartons such as those which are made from corrugated board. The pieces A and B meet along the line 10 and as shown in Figure 2 the pieces A and B should have an appreciable thickness.

A clip for joining the pieces A and B is referred to in its entirety by the ference character C. Obviously, as many of these clips would be employed as would be necessary to achieve

the desired holding effects. These clips would simply be spaced at appropriate intervals along the seam 10.

Each clip C includes a main body or base portion 11, the underface of which overlies the upper faces of the pieces A and B when the clip is in its final holding position. This main body portion 11 is of a substantially rectangular formation with a pointed tang 12 at each corner. As is clearly shown in Figures 2 and 4, the pointed tangs 12 are downwardly directed so that when the clip C is driven they become embedded in the material of the pieces A and B. Between the tangs 12 in each end of the clip a recess 13 is defined.

Upon referring to Figure 3 it will be noted that a plurality of the clips C are joined into a continuous strip S. This arrangement is achieved by initially having the pointed tangs 12 of adjacent clips joined by necks 14. These necks 14 are formed in the following manner:

Openings 15 are struck in the strip S and it will be noted that the openings 15 at each side have converging side edges 16. A notch 17 is struck inwardly from the outer side edges of the strip S substantially opposite to the points where the side edges 16 meet. Moreover, the forming tool which forms the openings 15 and notches 17 also forms a depression 18 in the upper faces of the necks 14 so that the points 12 before severance assume the downward inclination depicted in Figure 4. Thus, when the necks 14 are severed by the severing tool, definite assurance is had that the points 12 will be downwardly directed so as to become embedded in the material. It is evident that when the necks 14 are severed, the identity of the openings 15 is lost, and a half of each opening 15 now takes the form of a recess 13 at a free end of the clip.

Extending downwardly from the main body portion 11 adjacent to each end of the clip is a leg that is referred to in its entirety by the reference character L. Each leg L consists essentially of a pair of struts 19 and 20 which have their upper ends integrally joined to the main body portion of the clip. This joinder is represented by the areas at 21 in Figure 2 which shows the struts 20 as cut from the strip S but prior to being bent into the positions normal to the main body portion 11.

Integrally joined to the lower end of each pair of struts 19 and 20 is a pointed tab 22. The areas of the joinder of the tabs 22 to the struts 19 and 20 of each leg is indicated at 23. When the tabs 22 are bent from the position depicted in Figure 4 to that illustrated in Figure 2, the bending of the metal takes place in these zones 23.

It is important to note that each tab 22 is of a concavo-convex construction. That is, it is curved substantially on the segment of a cylinder with the shallow depressions opening inwardly, and the bulge being directed toward the free end of the clip. In this position the upper edge of each tab 22 such as shown at 24 is adapted to be engaged by a bending tool that comes downwardly through the recess 13. The lower end of each tab 22 is formed with a sharp point 25 which facilitates penetration of the material A and B.

Figure 6 shows a plurality of the clips C coiled into a magazine M. In order to prevent nesting such as would interfere with unwinding of the coil, each leg L has a pair of ears 27 which protrude from the outer edges opposite the zones 23. These ears are formed by a swedging operation that takes place immediately after the legs L are bent from the strip as shown in Figure 3. The portions of the metal at the outer side edges of the zones 23 are struck and thereby extruded into the ears 27.

While the manner of driving a clip is believed to be evident from the description given, it will be noted that the clips C are included in the magazine M in the condition illustrated. In this condition adjacent clips are joined by the unsevered necks 14, and the legs L assume a position substantially normal to the main body portion 11. The tabs 22 are slightly inclined with respect to the legs 11 as shown in Figure 4.

The free end of the magazine strip is fed to the driving machine. As a clip comes over the place where it is to be driven, a severing tool in the machine severs the necks 14 just prior to the time that the legs L and tabs 22 are being driven into the material. During this driving operation the struts 19 and 20 are supported by supporting tools which enter the end corners of the recesses 26, the latter recesses being formed by the cutting out of the legs L and the tabs 22.

When the machine has driven the clip to the point where the main body portion 11 engages the faces of the pieces A and B and the points 12 become embedded therein, bending tools come down through the recesses 13 and engage the upper curved edges 24 of the tabs 22 to bend the latter over the areas 23 into the positions shown in Figure 2 in which they are substantially parallel to the main body portion 11.

It may aid in the understanding of this operation to note that the supporting tools which are located at the end corners of the recesses 26 have their lower ends disposed substantially at the zones 23 when this bending operation takes place. Thus, the tabs 22 are bent around the lower extremities of these supporting tools as a fulcrum.

While a preferred specific embodiment of the invention is hereinbefore set forth, it is to be clearly understood that the invention is not to be limited to the exact constructions, mechanisms, and devices illustrated and described, because various modifications of these details may be provided in putting the invention into practice within the purview of the appended claims.

What is claimed is:

1. An integral clip formed from sheet metal comprising a flat base portion having a pair of spaced outwardly and downwardly extending tangs on each end, a leg struck from said base portion adjacent each end and extending substantially perpendicularly downward therefrom at each of said ends between said tangs, a central portion of each of said legs being severed upwardly and transversely of said leg adjacent the upper end thereof and bent laterally of said leg to underlie the spaces between said tangs whereby the upper ends of said central portions are adapted to be engaged by a tool to bend the central portion of each leg into a position substantially parallel to said base portion.

2. An integral clip formed from sheet metal comprising a flat base portion having a pair of spaced outwardly and downwardly extending tangs on each end, a leg having a pointed lower portion struck from said base portion adjacent each end and extending substantially perpendicularly downward therefrom at each of said ends between said tangs, a central portion of each of said legs being severed upwardly and transversely

of said leg adjacent the upper end thereof and bent laterally of said leg to underlie the spaces between said tangs whereby the upper ends of said central portions are adapted to be engaged by a tool to bend the central and lower portion of each leg into a position substantially parallel to said base portion.

3. An integral clip formed from sheet metal comprising a flat base portion having a pair of spaced outwardly and downwardly extending tangs on each end, a leg struck from said base portion adjacent each end and extending substantially perpendicularly downward therefrom at each of said ends between said tangs, a central portion of each of said legs being severed upwardly and transversely of said leg adjacent the upper end thereof and deformed into a concavo-convex structure and bent laterally of said leg to underlie the spaces between said tangs whereby the upper ends of said concavo-convex structures are adapted to be engaged by a tool to bend the central portion of each leg into a position substantially parallel to said base portion.

4. An integral clip formed from sheet metal comprising a flat base portion having a pair of spaced outwardly and downwardly extending tangs on each end, a leg having a pointed lower portion struck from said base portion adjacent each end and extending substantially perpendicularly downward therefrom at each of said ends between said tangs, a central portion of each of said legs being severed upwardly and transversely of said leg adjacent the upper end thereof and deformed into a concavo-convex structure and bent laterally of said leg to underlie the spaces between said tangs whereby the upper ends of said central portions are adapted to be engaged by a tool to bend the central and lower portion of each leg into a position substantially parallel to said base portion.

5. An integral clip formed from sheet metal comprising a flat base portion having a pair of spaced outwardly and downwardly extending tangs on each end, a leg having a pointed lower portion struck from said base portion adjacent each end and extending substantially perpendicularly downward therefrom at each of said ends between said tangs, a central portion of each of said legs being severed upwardly and transversely of said leg adjacent the upper end thereof and bent laterally of said leg to underlie the spaces between said tangs whereby the upper ends of said central portions are adapted to be engaged by a tool to bend the central and lower portion of each leg into a position substantially parallel to said base portion, and a pair of ears formed on the outer sides of each leg at the upper end of said pointed lower portion, said ears serving to limit penetration of the legs of one clip through the openings in the base portions of other clips.

6. In combination, a plurality of integral clips joined in a continuous strip with each clip comprising a flat base portion having a pair of spaced outwardly and downwardly extending tangs on each end with the pair of tangs at one end of one clip integrally joined to the pair of tangs at the end of the next adjacent clip, a leg struck from said base portion adjacent each end and extending substantially perpendicularly downward therefrom at each of said ends between said tangs, a central portion of each of said legs being severed upwardly and transversely of said leg adjacent the upper end thereof and bent laterally of said leg to underlie the spaces between said tangs whereby the upper ends of said central portions are adapted to be engaged by a tool to bend the central portion of each leg into a position substantially parallel to said base portion.

7. In combination, a plurality of integral clips joined in a continuous strip with each clip comprising a flat base portion having a pair of spaced outwardly and downwardly extending tangs at each end with the pair of tangs at one end of one clip integrally joined to the pair of tangs at the end of the next adjacent clip, a leg structure from said base portion adjacent each end and extending substantially perpendicularly downward therefrom at each of said ends between said tangs, a central portion of each of said legs being severed upwardly and transversely of said leg adjacent the upper end thereof and deformed into a concavo-convex structure and bent laterally of said leg to underlie the spaces between said tangs whereby the upper ends of said concavo-convex structures are adapted to be engaged by a tool to bend the central portion of each leg into a position substantially parallel to said base portion.

8. In combination, a plurality of integral clips joined in a continuous strip with each clip comprising a flat base portion having a pair of spaced outwardly and downwardly extending tangs at each end with the pair of tangs at one end of one clip integrally joined to the pair of tangs at the end of the next adjacent clip, a leg having a pointed lower portion struck from said base portion adjacent each end and extending substantially perpendicularly downward therefrom at each of said ends between said tangs, a central portion of each of said legs being severed upwardly and transversely of said leg adjacent the upper end thereof and bent laterally of said leg to underlie the spaces between said tangs whereby the upper ends of said central portions are adapted to be engaged by a tool to bend the central and lower portion of each leg into a position substantially parallel to said base portion, and a pair of ears formed on the outer sides of each leg at the upper end of said pointed lower portion, said ears serving to limit penetration of the legs of one clip through the openings in the base portions of other clips.

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