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PATENT SPECIFICATION



Application Date : June 2, 1931. No. 16,089/31. **362,832**

Complete Accepted : Dec. 10, 1931.

COMPLETE SPECIFICATION.

Improvements in or relating to Hand-operated Shearing Tools.

We, MANUFAX LIMITED, a Company registered under the Laws of Great Britain, of 38, Felsham Road, Putney, London, S.W. 15, and FREDERICK

5 DONALD LINGWOOD, British Subject, of 70, The Lawn, Shepherd's Bush, London, W. 12, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to hand-operated shearing tools and has for its object to provide an improved shearing tool which will be capable of severing miniature girders and like members formed, for example, of laminated sheet or strip metal.

15 A hand-operated shearing tool according to the present invention, more particularly for severing miniature girders formed of laminated sheet or strip metal, comprises two pivoted jaws the cooperating shearing portions of which are
20 formed at the outer ends of the jaws while parts of the jaws between the shearing portions and the pivot connecting the jaws are cut away to provide a gap between the jaws which will accommodate the flange of a girder, the shearing portion of one jaw of the tool being formed with a flat face of appreciable area acting as an anvil to support the part of the
25 girder to be sheared and one edge of the anvil face co-acting in the shearing operation with a part of the other jaw which is formed as a knife edge. Preferably the front of the anvil part which co-operates with the said knife edge is
30 formed flat with a straight cutting edge, while the back of the anvil part is so formed either curved or bevelled as to provide clearance which will permit of cutting through girder or like members at a substantial angle to the length of
35 such members without the anvil part fouling the girder flanges or other parts which may lie in planes at right angles to that of the part actually being sheared at any moment.

In a convenient arrangement the back of the anvil part is cut away or oppositely bevelled off so as to give to this part an

[Price 1/-]

approximately triangular cross-section in planes parallel to the anvil face on which the metal to be sheared rests. 55

The back of the knife edge portion of the cutting jaw, i.e. the part lying remote from the front face of this jaw which cooperates with the front of the anvil, is conveniently also similarly formed curved or oppositely bevelled off so that this knife edge part, while it will permit girders or like members to be cut through at a substantial angle to the length of such members in the manner referred to above, is also of robust construction. Further, a stop is preferably provided to limit the movement of the jaws towards one another after the shearing operation is completed, thus tending to prevent distortion of the metal sheared due to the knife edge jaw being forced to an unnecessary extent through the slot cut during shearing. 60 65 70 75

The invention may be carried into practice in various ways but one construction of tool according to this invention is illustrated by way of example in the accompanying drawings, in which 80

Figure 1 is a side elevation of the complete tool,

Figure 2 is a perspective view of the jaws of the tool shown in Figure 1,

Figure 3 is a section on the line 3—3 of Figure 1, 85

Figure 4 is an end view of the tool shown in Figure 1, and

Figure 5 is a plan of the jaws of the tool shown in Figure 1 indicating how the tool can be used to sever a girder diagonally. 90

In the construction illustrated the tool comprises an anvil jaw A and a cutting jaw B pivoted together at C and provided with handles D between which lies a spring E tending to separate these handles. As shown the ends of the jaws A and B remote from the pivot constitute the actual shearing portions, the jaws being cut away as shown at F between their end portions and the pivot so as to provide a space or gap in which can lie the flange of a girder while its web is being severed. 95 100 105

The end part A' of the anvil jaw A is

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PATENT SPECIFICATION



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362,330

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COMPLETE SPECIFICATION.

Improvements in or relating to Embossing Tools.

We, MANUFAX LIMITED, a Company registered under the Laws of Great Britain, of 38, Felsham Road, Putney, London, S.W. 15, and FREDERICK DONALD LINGWOOD, British Subject, of 70, The Lawn, Shepherd's Bush, London, W. 12, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to tools for embossing simultaneously superimposed layers of strip or sheet metal for the purpose of connecting members together, and has for its object to provide an improved tool suitable for use with various numbers of superimposed layers of sheet metal which will effect the embossing in a satisfactory manner without perforation of the layers.

To this end a tool according to the present invention for embossing simultaneously superimposed layers of strip or sheet metal for the purpose of connecting two members without perforating them comprises two jaws pivoted together, one jaw having therein a recess while the other jaw carries a pin or projection whose end has a diameter substantially less than the diameter of the recess and will enter or lie just within the mouth of the recess when the jaws are brought together, the superimposed layers of metal between these cooperating parts being then pressed out of their respective planes to such an extent that the metal layer in contact with the pin is pressed out into or beyond the plane of the next adjacent layer, each of the other layers being correspondingly pressed out of its own plane while the layer remote from the pin is free to expand as it is pressed out into the mouth of the recess. Preferably the mouth of the recess is of substantially cylindrical form and the end of the pin or projection is rounded, the relative dimensions of the rounded end of the pin and the mouth of the recess being such that the superimposed layers of metal will be simultaneously pressed out of their respective planes by the pin without any appreciable shearing action

taking place between the pin and the circumferential wall of the mouth of the recess and without the end of the pin causing a hole to be punched in the layer of metal on which it acts. Thus the diameter of the mouth of the recess and the extent to which the pin projects from the face of the jaw carrying it are conveniently so determined that when superimposed layers of sheet metal are placed between the jaws and the jaws brought together, the minimum distance between any point on the pin and the nearest point of the wall of the recess is at least as great as the sum of the thicknesses of the superimposed layers of metal being embossed.

The pin or projection is conveniently of substantially conical form with a rounded end and may be formed integral with or permanently secured to the jaw which carries it. Preferably however the pin is removably carried by this jaw and is formed integral with and projects from a screwthreaded member lying within a correspondingly screwthreaded bore in the jaw carrying the pin so that the extent to which this pin projects beyond the face of the jaw can be adjusted. Alternatively the pin may be formed integral with and project from a tapered base which lies within a correspondingly tapered bore in the jaw carrying the pin.

The invention may be carried into practice in various ways but two constructions according to this invention are illustrated by way of example in the accompanying drawings, in which

Figure 1 is a side elevation of a complete tool according to this invention,

Figure 2 is a side elevation partly in section and on an enlarged scale of the jaws of the tool shown in Figure 1,

Figure 3 is a similar view to Figure 2 showing how the embossing of superimposed metal layers is effected by a tool according to this invention, and

Figure 4 is a similar view to Figure 2 showing a modified form of the invention.

In the construction illustrated in Figures 1, 2 and 3 the tool comprises two jaws A and B pivoted together at C and provided with operating handles D.

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PATENT SPECIFICATION



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368,591

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COMPLETE SPECIFICATION.

Improvements in or relating to Clip-like Devices or Attachments for Use in the Making of Models or like Small Structures.

We, MANUFAX LIMITED, a Company registered under the Laws of Great Britain, of 38, Felsham Road, Putney, London, S.W.15, and FREDERICK DONALD LINGWOOD, British Subject, of 70, The Lawn, Shepherd's Bush, London, W.12, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to clip-like devices or attachments for use in the making of models or like small structures, and has for its object to provide a device or attachment for connecting a rod-like member to a part such as a girder formed of strip or sheet metal.

The device or attachment according to the present invention comprises a strip of sheet metal having opposite longitudinal margins cut away or cut and folded to provide a part of reduced width and form at least one pair of lugs projecting from the opposite edges of the remaining part or parts, the part of reduced width being bent to form an integral cylindrical sleeve which extends transversely to the length of the strip and is adapted to receive a rod or the like, so that when the surface of the device between each pair of lugs is placed in contact with a face of the girder flange or the like the lugs can be folded over opposite edges of this flange whereupon the device can be secured in position by embossing into each other the superimposed layers of metal comprised in the lugs, the part of the device between the lugs and the interposed parts of the member on which the device is mounted, this embossing being effected in such a manner as to cause the indented portions of the superimposed layers of metal to be pressed up out of their respective planes to such an extent that the lowermost metal layer is pressed out beyond the plane of the next adjacent layer, the second and other adjacent layers each being correspondingly pressed out beyond the plane of the layer lying immediately above it.

The part of reduced width, may be bent
[Price

into a V-shape with the cylindrical sleeve formed at the apex of the V, the arms of this V-shaped portion being inclined to and terminating in flat parts adapted to lie in contact with a face of the girder or other part on which the device is mounted, each of these flat parts having lugs adapted to be folded over and embrace opposite edges of the girder member. If desired in such an arrangement a clip-like strap may extend between the arms of the V-shaped portions adjacent to the sleeve at the apex.

Alternatively, the longitudinal edges of one end of the strip of sheet metal may be cut away to form a tongue and to provide at least one pair of lugs projecting from opposite edges at or near the other end, the tongue being bent to form a cylindrical sleeve with the free end of the tongue bent back so as to lie between the face of the portion of the device between the lugs and the adjacent face of the girder or like member on which the device is mounted.

The invention may be carried into practice in various ways but five alternative constructions according to this invention are illustrated by way of example in the accompanying drawings, in which

Figure 1 is a perspective view of one form of clip device or attachment according to this invention,

Figure 2 shows the blank from which the device shown in Figure 1 is formed,

Figure 3 is a side elevation of the device shown in Figure 1 with a strap device cooperating with it,

Figure 4 is a similar view to Figure 1 of an alternative form of attachment according to this invention,

Figure 5 is a perspective view of a further form of attachment according to this invention,

Figure 6 shows the blank from which the attachment shown in Figure 5 is formed,

Figures 7 and 8 shown two alternative forms of attachment according to this invention, and

Figure 9 shows in cross-section the form of the indentations employed in

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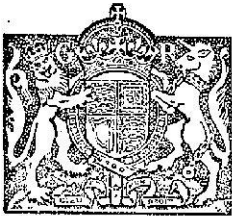
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PATENT SPECIFICATION



Application Date: April 29, 1931. No. 12,653/31.

368,132

Complete Accepted: March 3, 1932.

COMPLETE SPECIFICATION.

Improvements in or relating to Clip Devices for Use in the Making of Models or like Small Structures.

We, **MANUFAX LIMITED**, a Company registered under the Laws of Great Britain, of 38, Felsham Road, Putney, London, S.W.15, and **FREDERICK DONALD LINGWOOD**, British Subject, of 70, The Lawn, Shepherd's Bush, London, W.12, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to clip devices formed integral from sheet metal for use in the making of models or like small structures and has for its object to provide a clip device for connecting together girders of **H-** or **I-**section, members of **T-**, channel- or angle-section and tie bars or similar members formed of strip or sheet metal, which will be simple in construction and operation and will provide a rigid connection. For the sake of convenience members of the kind which clip devices according to this invention are adapted to connect will be hereinafter referred to as girder or similar members.

According to the present invention a clip device for use in the making of models or like small structures and for connecting together, without perforation of the parts, girders or similar members formed of strip or sheet metal, is formed integral of sheet metal comprising two flat main or body portions of similar dimensions which can be folded together to lie face to face with a space between them in which a flat portion of each girder member can be placed, and at least one extension or lug on one body portion which lug can be folded over the other body portion so as to lie on or embrace the latter thus locking one body portion to the other and providing superimposed parts of the clip device with interposed portions of the girder members all adapted to be simultaneously embossed in such a manner that the base of the indentation in the part of the clip device constituting one outside layer of the superimposed parts is pressed into or beyond the plane in which lies the part of the clip device constituting the other outside layer of the superimposed parts.

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The clip device may take various forms but in one form the two main or body portions of the device have a width substantially equal to the width of the girder member which they are adapted to embrace, the connection between the two body portions of the device extending from one end thereof over only a portion of their length so that when folded along their line of connection parts of the two body portions will lie spaced apart and parallel, permitting the interposition between them of a part of a girder member, one of the body portions having a lateral lug which when folded over will embrace the edge portion of the girder member interposed between the connected body portions, the superimposed parts of the device with the interposed portion of the girder member all being adapted to be embossed in the manner described. The unconnected end portions of the clip device each have an outwardly turned lug adapted to lie against the face of the flange of a second girder member whose web is interposed between these end portions of the clip device, a separate member folded to a flattened **G**-shape embracing the edges of the second girder flange and lying over the said outwardly directed lugs so that these superimposed parts can be simultaneously embossed in the manner described, thereby forming a rigid joint.

In an alternative construction the two main or body portions of the clip device have a similar **Y**-shape with their line of connection along the foot of the **Y**, the two portions of the clip when folded back embracing and extending from one edge portion of an interposed girder member, these superimposed parts all being adapted to be simultaneously embossed in the manner described. The arms of the two main **Y**-shaped parts of the clip device which then project laterally from the said first girder member are respectively adapted to have interposed between them two other and separate girder members, each arm of one of these body portions of the device having one or more lateral lugs each of which when folded over onto the corre-

PATENT SPECIFICATION



Application Date: April 29, 1931. No. 12,651/31.

368,131

Complete Accepted: March 3, 1932.

COMPLETE SPECIFICATION.

Improvements in or relating to Girder or like Structures for Use in the Making of Models or like Small Articles.

We, MANUPAX LIMITED, a Company registered under the Laws of Great Britain, of 38, Felsham Road, Putney, London, S.W. 15. and FREDERICK DONALD LANGWOOD, British Subject, of 70, The Lawn, Shepherd's Bush, London, W. 12, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to girder or like structures for use in the making of models or like small articles, and has for its object to provide a form of structure which will be of a simple and rigid nature, will be capable of being readily assembled and will have an appearance somewhat similar to larger girder structures.

To this end a structure according to the present invention for use in the making of models or like small articles comprises in combination a member which is a girder of H, T, channel, angle or other section or a bar, a second member which is a girder of H, T, channel, angle or other section or a bar, both these members having a laminated formation of strip or sheet metal, a clip device connecting these members by parts of the clip device embracing or engaging parts of the respective members, and indentations in each of the parts of the clip device and a member which are in engagement, each of these indentations being such as to cause the indented portions of the superimposed layers of metal to be pressed up out of their respective planes to such an extent that the lowermost metal layer is pressed out beyond the plane of the next adjacent layer, the second and other adjacent layers each being correspondingly pressed out beyond the plane of the layer lying immediately above it so that the indentations prevent relative movement between the parts of the clip device and the members with which these parts are in engagement.

The clip device may be formed integral or may comprise two or more parts which interengage when assembled and form a complete clip device. In any case parts

of the clip device conveniently embrace the edges of the members to be connected thereby and indentations of the kind referred to are formed in the superimposed parts of the members and the clip device.

Further, the indentation formed in one outermost layer due to the next layer being pressed up beyond the plane in which lies the main part of such outermost layer, is preferably such that its outer convex surface resembles a miniature rivet head or bolt head, thus giving to the structure the appearance of having its parts riveted or bolted together.

The invention may be carried into practice in various ways but ten alternative structures according to this invention are illustrated by way of example in the accompanying drawings, in which

Figure 1 is a perspective view of a structure according to this invention comprising two I-section girders, one flange of one of which rests upon the other and is connected thereto by an integral clip device,

Figure 2 is a similar view to Figure 1 showing an alternative structure according to this invention comprising an I-section girder one flange of which rests on the end of a second I-section girder and is connected thereto by an integral clip device,

Figure 3 shows an alternative structure according to this invention comprising an I-section girder the edges of the flanges of which rest on the ends of the flanges of a second I-section girder, the two girders being connected together by two clip devices,

Figure 4 is a perspective view of a structure according to this invention comprising a member of T-section and a member of angle section connected by an integral clip device,

Figure 5 shows an alternative structure according to this invention comprising two members each of T-section connected by an integral clip device,

Figure 6 shows a structure according to this invention comprising a member of T-section connected to a plain bar by an

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362,330

Application Date: June 2, 1931. No. 16,088/31.

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COMPLETE SPECIFICATION.



Improvements in or relating to Embossing Tools.

We, **MANUFAX LIMITED**, a Company registered under the Laws of Great Britain, of 38, Felsham Road, Putney, London, S.W. 15, and **FREDERICK DONALD LINGWOOD**, British Subject, of 70, The Lawn, Shepherd's Bush, London, W. 12, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to tools for embossing simultaneously superimposed layers of strip or sheet metal for the purpose of connecting members together, and has for its object to provide an improved tool suitable for use with various numbers of superimposed layers of sheet metal which will effect the embossing in a satisfactory manner without perforation of the layers.

To this end a tool according to the present invention for embossing simultaneously superimposed layers of strip or sheet metal for the purpose of connecting two members without perforating them comprises two jaws pivoted together, one jaw having therein a recess while the other jaw carries a pin or projection whose end has a diameter substantially less than the diameter of the recess and will enter or lie just within the mouth of the recess when the jaws are brought together, the superimposed layers of metal between these cooperating parts being then pressed out of their respective planes to such an extent that the metal layer in contact with the pin is pressed out into or beyond the plane of the next adjacent layer, each of the other layers being correspondingly pressed out of its own plane while the layer remote from the pin is free to expand as it is pressed out into the mouth of the recess. Preferably the mouth of the recess is of substantially cylindrical form and the end of the pin or projection is rounded, the relative dimensions of the rounded end of the pin and the mouth of the recess being such that the superimposed layers of metal will be simultaneously pressed out of their respective planes by the pin without any appreciable shearing action

taking place between the pin and the circumferential wall of the mouth of the recess and without the end of the pin causing a hole to be punched in the layer of metal on which it acts. Thus the diameter of the mouth of the recess and the extent to which the pin projects from the face of the jaw carrying it are conveniently so determined that when superimposed layers of sheet metal are placed between the jaws and the jaws brought together, the minimum distance between any point on the pin and the nearest point of the wall of the recess is at least as great as the sum of the thicknesses of the superimposed layers of metal being embossed.

The pin or projection is conveniently of substantially conical form with a rounded end and may be formed integral with or permanently secured to the jaw which carries it. Preferably however the pin is removably carried by this jaw and is formed integral with and projects from a screwthreaded member lying within a correspondingly screwthreaded bore in the jaw carrying the pin so that the extent to which this pin projects beyond the face of the jaw can be adjusted. Alternatively the pin may be formed integral with and project from a tapered base which lies within a correspondingly tapered bore in the jaw carrying the pin.

The invention may be carried into practice in various ways but two constructions according to this invention are illustrated by way of example in the accompanying drawings, in which

Figure 1 is a side elevation of a complete tool according to this invention,

Figure 2 is a side elevation partly in section and on an enlarged scale of the jaws of the tool shown in Figure 1,

Figure 3 is a similar view to Figure 2 showing how the embossing of superimposed metal layers is effected by a tool according to this invention, and

Figure 4 is a similar view to Figure 2 showing a modified form of the invention.

In the construction illustrated in Figures 1, 2 and 3 the tool comprises two jaws A and B pivoted together at C and provided with operating handles D.

Formed in the jaw A is a plain cylindrical recess A^1 and formed in the jaw B opposite to the recess A^1 is a screwthreaded recess B^1 in which is mounted a screwthreaded member E. Formed integral with the member E is a conical pin E^1 having a rounded end which projects beyond that face of the jaw B lying adjacent to the jaw A, the member E constituting in effect the base of the pin E^1 .

The superimposed layers of sheet metal which are to be embossed are placed between the jaws A and B and the jaws are then brought together as shown in Figure 3, whereupon the rounded end of the pin E^1 engages the lowermost layer F and forces it up into or beyond the plane of the next adjacent layer F^1 , this next adjacent layer in turn forcing up the layer F^2 above it and so on, so that a portion F^3 of the outermost layer of metal F^4 is forced into the recess A^1 as shown, the outer surface of the boss F^3 thus formed in the outermost layer being of part-spherical form as shown and resembling the head of a miniature rivet or bolt.

It will be seen that the extent to which the jaws A and B can be brought together is determined by the number of superimposed layers of metal which are placed between them, and in this way the extent to which the embossed portion of each layer is pressed out of the plane of such layer is substantially the same irrespective of the number of layers simultaneously embossed, the outermost layer remote from the pin tending always to assume the form shown in Figure 3 so as to resemble a miniature rivet head.

In the alternative arrangement shown in Figure 4 the jaw A is similar to that in the construction shown in Figures 1, 2 and 3. The other jaw B^2 , however, instead of being provided with a screwthreaded bore as in the construction shown in Figures 1, 2 and 3, is provided with a tapered bore B^3 in which is disposed a correspondingly tapered member G from which extends a conical pin G^1 similar to the pin E^1 in the construction shown in Figures 1, 2 and 3. It will be seen that the member G with the pin G^1 can be removed from the conical bore B^3 through the end of this bore lying adjacent to the jaw A. The operation of the tool shown in Figure 4 is similar to that shown in Figure 3.

It is to be understood that the constructions described with reference to the drawings are given by way of example only and that constructional details may be modified considerably without departing from this invention.

Having now particularly described and

ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A tool for embossing into each other simultaneously superimposed layers of strip or sheet metal for the purpose of connecting two members without perforating them, comprising two jaws pivoted together, one jaw having therein a recess while the other jaw carries a pin or projection whose end has a diameter substantially less than the diameter of the recess and will enter or lie just within the mouth of the recess when the jaws are brought together, the superimposed layers of metal between these cooperating parts being then pressed out of their respective planes to such an extent that the metal layer in contact with the pin is pressed out into or beyond the plane of the next adjacent layer each of the other layers being correspondingly pressed out of its own plane while the layer remote from the pin is free to expand as it is pressed out into the mouth of the recess.

2. A tool for embossing into each other simultaneously superimposed layers of strip or sheet metal as claimed in Claim 1, in which the mouth of the recess is of substantially cylindrical form and the end of the pin or projection is rounded, the relative dimensions of the rounded end of the pin and the mouth of the recess being such that the superimposed layers of metal will be simultaneously pressed out of their respective planes by the pin without any appreciable shearing action taking place between the pin and the circumferential wall of the mouth of the recess and without the end of the pin causing a hole to be punched in the layer of metal on which it acts.

3. A tool for embossing into each other simultaneously superimposed layers of strip or sheet metal as claimed in Claim 2 in which the diameter of the mouth of the recess and the extent to which the pin projects from the face of the jaw carrying it are so determined that when superimposed layers of sheet metal are placed between the jaws and the jaws brought together, the minimum distance between any point on the pin and the nearest point of the wall of the recess is at least as great as the sum of the thicknesses of the superimposed layers of metal being embossed.

4. A tool for embossing into each other simultaneously superimposed layers of strip or sheet metal as claimed in any one of the preceding claims in which the recess is substantially cylindrical and the pin is of substantially conical form with a rounded end.

5. A tool for embossing into each other simultaneously superimposed layers of strip or sheet metal as claimed in any one of the preceding claims in which the pin 5 is formed integral with and projects from a screwthreaded base which engages a correspondingly screwthreaded bore in the jaw carrying the pin so that the extent to which the pin projects beyond the face 10 of the jaw can be adjusted.

6. A tool for embossing into each other simultaneously superimposed layers of strip or sheet metal as claimed in Claim 1 and Claim 2, Claim 3 or Claim 4, in

which the pin is formed integral with and projects from a tapered base which lies within a correspondingly tapered bore in the jaw carrying the pin. 15

7. The complete tool for embossing into each other simultaneously superimposed layers of strip or sheet metal substantially as described and shown in Figures 1, 2 and 3 or in Figure 4 of the accompanying drawings. 20

Dated this 2nd day of June, 1931.

KILBURN & STRODE,
Agents for the Applicants.

FIG. 1.

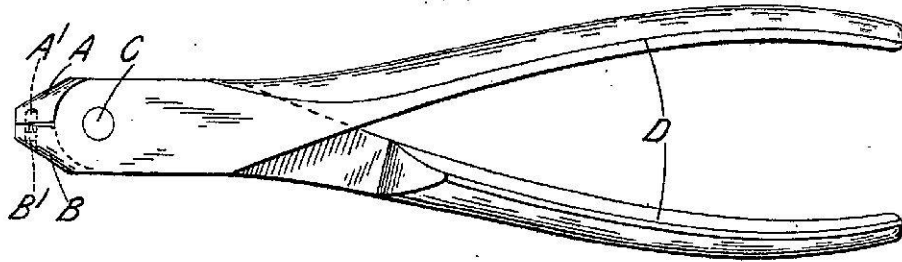


FIG. 2.

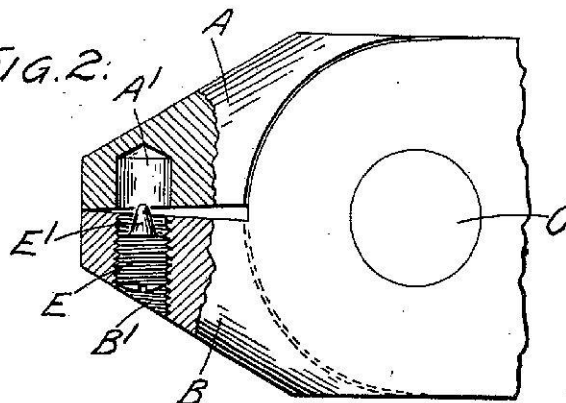


FIG. 3.

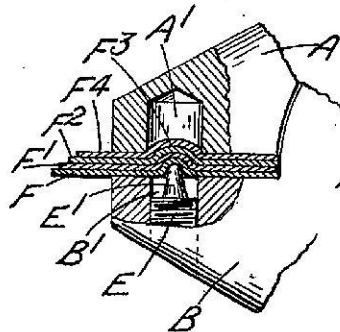
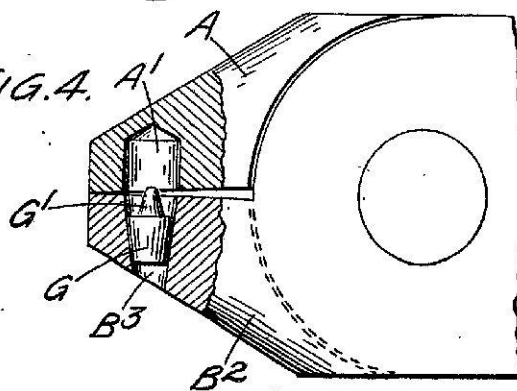


FIG. 4.



[This Drawing is a reproduction of the Original on a reduced scale.]

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Application Date : June 2, 1931. No. 16,089 / 31. **362,832**

Complete Accepted : Dec. 10, 1931.

COMPLETE SPECIFICATION.

Improvements in or relating to Hand-operated Shearing Tools.

We, MANUFAX LIMITED, a Company registered under the Laws of Great Britain, of 38, Felsham Road, Putney, London, S.W. 15, and FREDERICK

5 DONALD LINGWOOD, British Subject, of 70, The Lawn, Shepherd's Bush, London, W. 12, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

10 This invention relates to hand-operated shearing tools and has for its object to provide an improved shearing tool which will be capable of severing miniature girders and like members formed, for example, of laminated sheet or strip metal.

15 A hand-operated shearing tool according to the present invention, more particularly for severing miniature girders formed of laminated sheet or strip metal, comprises two pivoted jaws the cooperating shearing portions of which are
20 formed at the outer ends of the jaws while parts of the jaws between the shearing portions and the pivot connecting the jaws are cut away to provide a gap between the jaws which will accommodate
25 the flange of a girder, the shearing portion of one jaw of the tool being formed with a flat face of appreciable area acting as an anvil to support the part of the girder to be sheared and one edge of the
30 anvil face co-acting in the shearing operation with a part of the other jaw which is formed as a knife edge. Preferably the front of the anvil part which co-operates with the said knife edge is
35 formed flat with a straight cutting edge, while the back of the anvil part is so formed either curved or bevelled as to provide clearance which will permit of cutting through girder or like members
40 at a substantial angle to the length of such members without the anvil part fouling the girder flanges or other parts which may lie in planes at right angles to that of the part actually being sheared at
45 any moment.

50 In a convenient arrangement the back of the anvil part is cut away or oppositely bevelled off so as to give to this part an
[Price 1/-]

approximately triangular cross-section in planes parallel to the anvil face on which the metal to be sheared rests. 55

The back of the knife edge portion of the cutting jaw, i.e. the part lying remote from the front face of this jaw which cooperates with the front of the
60 anvil, is conveniently also similarly formed curved or oppositely bevelled off so that this knife edge part, while it will permit girders or like members to be cut through at a substantial angle to the
65 length of such members in the manner referred to above, is also of robust construction. Further, a stop is preferably provided to limit the movement of the
70 jaws towards one another after the shearing operation is completed, thus tending to prevent distortion of the metal sheared due to the knife edge jaw being forced to an unnecessary extent through the slot
75 cut during shearing.

The invention may be carried into practice in various ways but one construction of tool according to this invention is illustrated by way of example in the accompanying drawings, in which 80

Figure 1 is a side elevation of the complete tool,

Figure 2 is a perspective view of the jaws of the tool shown in Figure 1,

Figure 3 is a section on the line 3—3
85 of Figure 1,

Figure 4 is an end view of the tool shown in Figure 1, and

Figure 5 is a plan of the jaws of the tool shown in Figure 1 indicating how
90 the tool can be used to sever a girder diagonally.

In the construction illustrated the tool comprises an anvil jaw A and a cutting jaw B pivoted together at C and provided
95 with handles D between which lies a spring E tending to separate these handles. As shown the ends of the jaws A and B remote from the pivot constitute the actual shearing portions, the
100 jaws being cut away as shown at F between their end portions and the pivot so as to provide a space or gap in which can lie the flange of a girder while its web
105 is being severed.

The end part A' of the anvil jaw A is

Price 25/-

formed as shown with a flat upper surface A^2 constituting an anvil on which can rest the web of a girder to be severed, while the end B^1 of the cutting jaw B is formed as a knife edge which co-acts during the shearing operation with the front edge of the anvil. The back of the anvil part A^1 of the jaw A, i.e. the part remote from the cutting edge, is cut away or oppositely bevelled off as shown at A^3 so that the part A^1 is of triangular cross-section in planes parallel to the anvil face A^2 as shown in Figure 2. Similarly the back of the part B^1 of the jaw B is oppositely bevelled off as shown at B^3 in Figure 5, while the part C^1 of each jaw forming the end of the recess adjacent the pivot C is bevelled or rounded as shown.

In cutting a miniature girder the part of the girder which is to be used is placed on the face A^2 of the anvil part A and, by reason of the area of the face A^2 of this jaw, this part of the girder during the shearing operation will tend not to be bent or distorted but will be cut off cleanly. Further, owing to the triangular cross-section of the part A^1 and the manner in which the jaw B is bevelled off at B^3 as well as the dimensions of the recess F and the bevelling of the part C^1 , a miniature girder can be inserted between the jaws and its web cut diagonally completely across and right up to its flanges either in a direction at right angles to the length of the girder or diagonally at any angle up to approximately 25° to the longitudinal axis of the girder without any part of the tool fouling the girder flanges. The manner in which this construction and arrangement of the parts makes it possible to sever diagonally the webs of miniature girders is indicated in Figure 5.

A stop C^2 is conveniently provided to limit the amount which the shearing portions A^1 and B^1 of the jaws can overlap when the shearing operation is completed, thus preventing distortion of the girder after cutting due to the cutting jaw B B^1 being forced to any considerable extent through the slot cut.

It is to be understood that the construction illustrated is given by way of example only and that constructional details may be modified without departing from this invention.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A hand-operated shearing tool more particularly for severing miniature girders formed of laminated sheet or strip

metal, comprising two pivoted jaws the cooperating shearing portions of which are formed at the outer ends of the jaws while parts of the jaws between the shearing portions and the pivot connecting the jaws are cut away to provide a gap between the jaws which will accommodate the flange of a girder, the shearing portion of one jaw of the tool being formed with a flat face of appreciable area acting as an anvil to support the part of the girder to be sheared, one edge of the anvil face co-acting in the shearing operation with a part of the other jaw which is formed as a knife edge.

2. A hand-operated shearing tool more particularly for severing miniature girders formed of laminated sheet or strip metal, comprising two pivoted jaws the cooperating shearing portions of which are formed at the outer ends of the jaws while the parts of the jaws between these shearing portions and the pivot connecting the jaws are cut away to provide a gap between the jaws which will accommodate the flange of a girder, the shearing portion of one jaw being formed as a knife edge while the shearing portion of the other jaw is formed as an anvil having a flat face of appreciable area to support that part of the girder on which the shears operate, the front of this anvil which cooperates with the said knife edge being formed flat with a straight cutting edge while the back of the anvil is so formed either curved or bevelled as to provide clearance which will permit of cutting through girder or like members at a substantial angle to the length of such members without fouling the girder flanges or other parts lying in planes at right angles to that of the part being sheared.

3. A hand-operated shearing tool as claimed in Claim 2 in which the back of the anvil part is cut away or oppositely bevelled off so as to give to the anvil part an approximately triangular cross-section in planes parallel to the anvil face on which the material to be sheared rests.

4. A hand-operated shearing tool as claimed in Claim 2 or Claim 3 in which the back of the knife edge jaw which lies remote from the flat face of such jaw co-operating with the anvil jaw is formed curved or bevelled in a similar manner to the back of the anvil jaw for the purpose set forth.

5. A hand-operated shearing tool as claimed in any one of the preceding claims, in which a stop is provided to limit the movement of the jaws towards one another after the shearing operation is completed, thereby tending to prevent or limit distortion of the metal sheared.

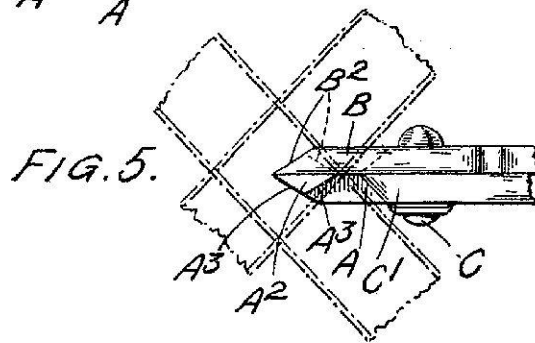
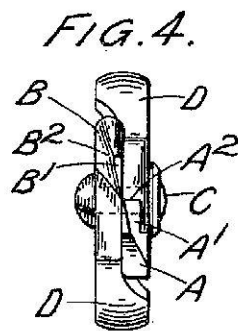
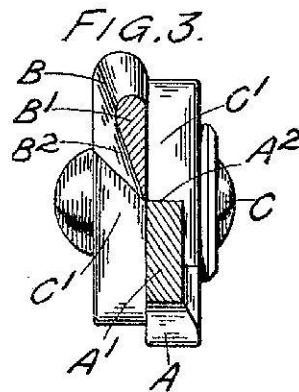
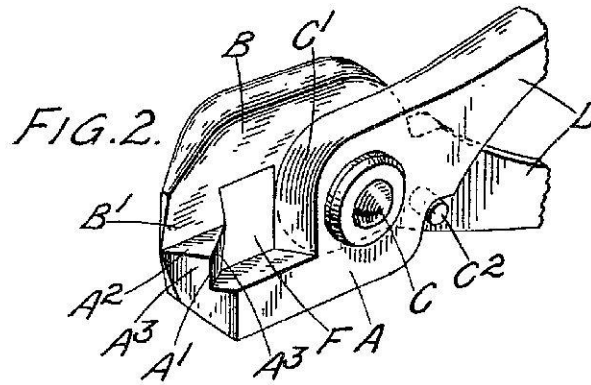
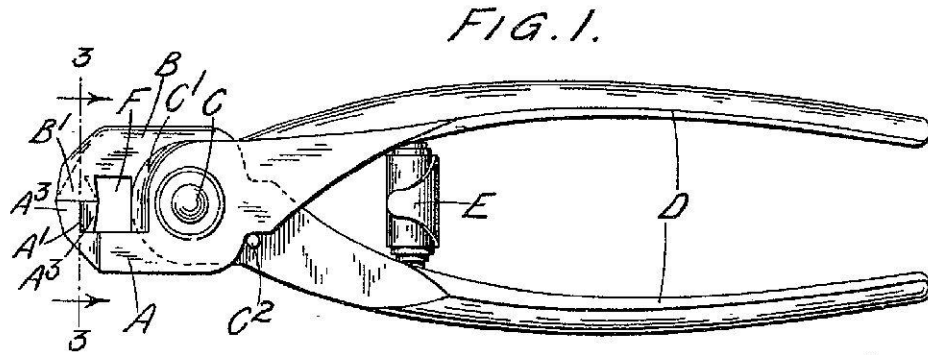
6. The complete hand-operated shearing tool substantially as described with reference to the accompanying drawings.

Dated this 2nd day of June, 1931.

KILBURN & STRODE,
Agents for the Applicants.

Redhij Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1931.

[This Drawing is a reproduction of the Original on a reduced scale.]



PATENT SPECIFICATION



Application Date: April 29, 1931. No. 12,651 / 31.

368,131

Complete Accepted: March 3, 1932.

COMPLETE SPECIFICATION.

**Improvements in or relating to Girder or like Structures for Use
in the Making of Models or like Small Articles.**

We, MANUFAX LIMITED, a Company registered under the Laws of Great Britain, of 38, Felsham Road, Putney, London, S.W. 15. and FREDERICK DONALD LINGWOOD, British Subject, of 70, The Lawn, Shepherd's Bush, London, W. 12, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to girder or like structures for use in the making of models or like small articles, and has for its object to provide a form of structure which will be of a simple and rigid nature, will be capable of being readily assembled and will have an appearance somewhat similar to larger girder structures.

To this end a structure according to the present invention for use in the making of models or like small articles comprises in combination a member which is a girder of H, T, channel, angle or other section or a bar, a second member which is a girder of H, T, channel, angle or other section or a bar, both these members having a laminated formation of strip or sheet metal, a clip device connecting these members by parts of the clip device embracing or engaging parts of the respective members, and indentations in each of the parts of the clip device and a member which are in engagement, each of these indentations being such as to cause the indented portions of the superimposed layers of metal to be pressed up out of their respective planes to such an extent that the lowermost metal layer is pressed out beyond the plane of the next adjacent layer, the second and other adjacent layers each being correspondingly pressed out beyond the plane of the layer lying immediately above it so that the indentations prevent relative movement between the parts of the clip device and the members with which these parts are in engagement.

The clip device may be formed integral or may comprise two or more parts which interengage when assembled and form a complete clip device. In any case parts

of the clip device conveniently embrace the edges of the members to be connected thereby and indentations of the kind referred to are formed in the superimposed parts of the members and the clip device.

Further, the indentation formed in one outermost layer due to the next layer being pressed up beyond the plane in which lies the main part of such outermost layer, is preferably such that its outer convex surface resembles a miniature rivet head or bolt head, thus giving to the structure the appearance of having its parts riveted or bolted together.

The invention may be carried into practice in various ways but ten alternative structures according to this invention are illustrated by way of example in the accompanying drawings, in which

Figure 1 is a perspective view of a structure according to this invention comprising two I-section girders one flange of one of which rests upon the other and is connected thereto by an integral clip device,

Figure 2 is a similar view to Figure 1 showing an alternative structure according to this invention comprising an I-section girder one flange of which rests on the end of a second I-section girder and is connected thereto by an integral clip device,

Figure 3 shows an alternative structure according to this invention comprising an I-section girder the edges of the flanges of which rest on the ends of the flanges of a second I-section girder, the two girders being connected together by two clip devices,

Figure 4 is a perspective view of a structure according to this invention comprising a member of T-section and a member of angle section connected by an integral clip device,

Figure 5 shows an alternative structure according to this invention comprising two members each of T-section connected by an integral clip device,

Figure 6 shows a structure according to this invention comprising a member of T-section connected to a plain bar by an

integral clip device,

Figure 7 shows a structure according to this invention comprising an I-section girder connected to a member of channel section by an integral clip device,

Figure 8 shows a structure according to this invention comprising two members of L-section connected together by an integral clip device,

Figure 9 shows a structure according to this invention comprising a member of L-section connected to a plain bar by an integral clip device,

Figure 10 shows a structure according to this invention comprising a member of T-section connected to a plain bar by a clip device comprising a number of parts, and

Figure 11 shows in cross-section the form of the indentations employed in structures according to this invention.

In the construction shown in Figure 1 the structure comprises an I-section girder A having a laminated formation of sheet metal, the lower flange of which rests on the upper flange of a second I-section girder B also having a laminated formation of sheet metal and disposed at right angles to the girder A. Interposed between the adjacent flanges of the two girders is a clip device comprising a body part C of rectangular form from one pair of opposite edges of which extend lugs C¹ which are bent over the adjacent edges of the lower flange of the girder A. From the other pair of opposite edges of the body part C extend lugs C² which are bent over and embrace the edges of the upper flange of the girder B. Indentations D are formed in the superimposed portions of the clip device and the girder flanges embraced thereby, these indentations being formed as shown in Figure 11 so that each layer of metal is pressed out of its own plane to such an extent that the pressed-out portion extends beyond the plane in which lies the main part of the next adjacent layer of metal.

The construction shown in Figure 2 comprises an I-section girder A¹ having a laminated formation of sheet metal and a similar member B¹ on the upper end of which rests the lower flange of the girder A¹. Connecting the upper end of the girder B¹ to the lower flange of the girder A¹ is an integral clip device comprising a body part E from one pair of opposite edges of which extend parts E¹ which are bent as shown so as to lie respectively in contact with the outer faces of the flanges of the girder B¹. Extending from the other pair of opposite edges of the body part E are two lugs E² which are bent over and embrace the edges of the lower flange of the girder A¹

as shown. Extending from one pair of opposite edges of each of the parts E¹ are further lugs E³ similar to the lugs E², these lugs being bent over and embracing the edges of the flanges of the girder B¹. Indentations D of the type shown in Figure 11 are formed in the superimposed parts of the clip device and the girder flanges as shown.

The structure shown in Figure 3 comprises an I-section girder A² having a laminated formation of sheet metal which rests on the upper end of a similar I-section girder B² with the edges of the flanges of the girder A² resting on the ends of the flanges of the girder B² which are cut away somewhat as shown so that the web of the girder B² can also bear on the web of the girder A². Connecting the two girders together are two similar clip devices each of which comprises a body part F from one edge of which extends a lug F¹ the main part of which lies against the outer face of one of the flanges of the girder A² while its end portion is bent over the edge of such flange remote from the girder B². Extending from lateral edges of the body part F of each of the clip devices are two further lugs F² which are bent round and embrace the edges of the adjacent flange of the girder B². Indentations D of the type indicated in Figure 11 are formed in the superimposed parts of the clip device and the girder flanges as shown.

In the construction shown in Figure 4 the structure comprises a member A³ of T-section having a laminated formation of sheet metal disposed at right angles to a member B³ of channel section also having a laminated formation of sheet metal. Interposed between and embracing parts of these members is a clip device comprising a body part G of rectangular form from one pair of opposite edges of which extend lugs G¹ which are bent over the adjacent edges of the member A³ as shown. From the other pair of opposite edges of the body part G extend lugs G² which are bent as shown to embrace the sides of the member B³ of channel section. Indentations D are formed in the superimposed portions of the body part G, the member A³ and the lugs G¹ and also in the superimposed parts of the lugs G² and the sides of the member B³, these indentations being formed as shown in Figure 11.

The construction shown in Figure 5 comprises a member A⁴ of T-section having a laminated formation of sheet metal and a similar member B⁴ disposed at right angles thereto with the end of the member B⁴ resting on the flange of the member A⁴.

Interposed between and engaging the members A^4 and B^4 is a clip device comprising a body part H interposed between the end of the member B^4 and the flange of the member A^4 . Extending from one pair of opposite edges of the body part H are lugs H^1 which, as shown embrace the flange of the member A^4 . Extending from the other pair of opposite edges of the body part H are respectively, on the one hand, a tongue-like part H^2 having formed thereon lugs H^3 which embrace the web of the member B^4 and have parts H^4 lying against the inner face of the flange of the member B^4 , and, on the other hand, a part extending at right angles to the body part H so as to lie against the outer face of the flange of the member B^4 , this part having lugs H^5 which are bent over the edges of this flange and embrace this flange and the parts H^4 of the clip device as shown. Indentations D of the kind shown in Figure 11, are formed in the superimposed parts respectively of the body part H , the flange of the member A^4 and the lugs H^1 , in the superimposed parts of the lugs H^3 and the web of the member B^4 , and in the superimposed parts of the lugs H^5 , the parts H^4 and the flange of the member B^4 .

The structure illustrated in Figure 6 comprises a member A^5 of T-section having a laminated formation of sheet metal on the flange of which rests a plain bar B^5 also having a laminated formation of sheet metal. Interposed between and engaging parts of the members A^5 and B^5 is a clip device comprising a body part J of substantially rectangular shape from one pair of opposite edges of which extend lugs J^1 embracing the edges of the flange of the member A^5 , while from the other pair of opposite edges of the body part J extend a pair of lugs J^2 embracing the edges of the member B^5 . Indentations D of the kind shown in Figure 11 are formed in the superimposed parts of the lugs J^1 , the flange of the member A^5 , the member B^5 and the lugs J^2 .

The structure illustrated in Figure 7 comprises an I-section girder A^6 and a channel member B^6 each having a laminated formation of sheet metal, the member B^6 being disposed at right angles to the girder A^6 with its end resting on one of the flanges of this girder. Interposed between and engaging parts of the girder A^6 and the channel section member B^6 is a clip device comprising a body part K lying against the outer face of the upper flange of the girder A^6 and having lugs K^1 extending from one pair of opposite edges thereof and embracing the

edges of this flange. Extending upwards from one of the other pair of opposite edges of the body part K is a part K^2 lying against the outer face of the base of the channel member B^6 and having lugs K^3 extending from opposite edges thereof and embracing the sides of this channel member.

Indentations D of the kind indicated in Figure 11 are formed in the superimposed parts of the lugs K^1 , the flange of the girder A^6 and the body part K , and in the superimposed parts of the lugs K^3 and the sides of the channel member B^6 .

The construction shown in Figure 8 comprises two members of L-section having a laminated formation of sheet metal and disposed at right angles to one another, one of these members comprising parts A^7 , A^8 , while the other comprises parts B^7 , B^8 . One side B^8 of the member B^7 , B^8 is cut away so that while its end rests on the uppermost edge of the adjacent side A^8 of the member A^7 , A^8 , the end of the other side B^7 of the member B^7 , B^8 can rest on the inner face of the other side A^7 of the member A^7 , A^8 as shown. Engaging parts of the two L-section members is a clip device comprising a body part L from which extend three lugs L^1 , L^2 , L^3 . The lug L^1 is bent round the edge of and embraces a part of the side B^8 of the member B^7 , B^8 , while the lug L^2 extends round and embraces a part of the other side B^7 of the member B^7 , B^8 as shown. The lug L^3 , on the other hand, extends round the outer face of the member A^7 , A^8 and is bent over the edge of the side A^7 thereof as shown.

Indentations D of the kind shown in Figure 11 are formed in the superimposed parts of the clip device and the members A^7 , A^8 and B^7 , B^8 .

The construction illustrated in Figure 9 comprises a member of L-section comprising parts A^9 and A^{10} and having a laminated formation of sheet metal, and a bar B^9 also formed of laminated sheet metal, disposed at right angles thereto with its end resting on the edge of the side A^{10} of the member A^9 , A^{10} as shown.

Engaging parts of the members A^9 , A^{10} and B^9 is a clip device comprising parts M , M^1 which are connected along one edge and lie against the opposite faces of the member B^9 . Extending from the free edge of the part M is a lug M^2 which is bent round the adjacent edge of the part B^9 and lies against the outer face of the part M^1 . Extending from the lower edge of the part M^1 is a lug M^3 a part of which lies against the inner face of the side A^{10} of the member A^9 , A^{10} .

while its end is bent at right angles so as to lie against the inner face of the part A^9 . Extending from the lower edge of the part M is a lug M^4 which extends
 5 round the outside of the channel member A^9 , A^{10} and has its end bent over the edge of the part A^9 thereof so as to embrace this edge and lie on the end portion of the lug M^3 as shown.

10 Indentations D of the kind shown in Figure 11 are formed in the superimposed parts M , B^9 , M^1 and M^2 , in the superimposed parts M^3 , A^{10} and M^4 , and in the superimposed parts M^4 , A^9 , M^3 M^4 so
 15 as to connect the parts rigidly together.

The construction illustrated in Figure 10 comprises a member A^{11} of T-section and a bar B^{10} both having a laminated formation of sheet metal, the bar B^{10}
 20 being disposed at right angles to the member A^{11} with its end resting on the flange of the member A^{11} . The two members A^{11} and B^{10} are connected together by a clip device comprising an
 25 angle piece N having lugs N^1 which extend around and embrace the opposite edges of the member B^{10} and an angle piece N^2 which lies against the lugs N^1 and itself has lugs N^3 lying against the
 30 part N . Interposed between the flange of the member A^{11} and the parts of the angle pieces N and N^2 which lie parallel to this flange is a member N^4 of rectangular form. The ends of the parts of the angle
 35 pieces N and N^2 which lie parallel to the flange of the girder A^{11} are bent over and extend underneath the end portions of the member N^4 as shown and the edges N^5 of this member N^4 are bent over and
 40 embrace the flanges of the member A^{11} .

Indentations D of the general type indicated in Figure 11 are formed in the superimposed layers N^3 , N , B^{10} , N^1 , N^2
 45 A^{11} , N^5 so as to connect the parts rigidly together.

Figure 11 merely shows the general form of the indentations D employed in structures according to this invention as
 50 shown for example in Figures 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 of the accompanying drawings, the indentation D being shown in Figure 11 as formed in superimposed parts comprising in all five layers O , O^1 ,
 55 O^2 , O^3 and O^4 of sheet metal. It will be seen that the layer O is pressed up at D out of its plane to a point beyond the plane in which lies the main part of the layer O^1 , while similarly, each of the
 60 other layers O^1 , O^2 , O^3 is pressed up at D out of its plane to a point beyond the plane in which lies the main part of the layer immediately above it, the form of the indentation in the layer O^4 being
 65 such that its outer convex surface O^5

resembles a miniature rivet head or bolt head. Thus the indentations tend to give to the structures an appearance of having the various parts constituting
 70 them riveted or bolted together.

It will therefore be seen that in a structure according to the present invention the laminated girders may be reproductions in miniature of full size laminated
 75 steel girders, such as have been proposed for building construction, while the structure as a whole presents an appearance similar to full size structures, the convex surfaces of the indentations appearing as bolt or rivet heads.
 80

It is to be understood that the constructions illustrated in the accompanying drawings are given by way of example only and that the form of the members from which the structure is built up, as
 85 well as the details of the clip devices, may be varied without departing from this invention.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—
 90

1. A structure for use in the making of models or like small articles, comprising in combination a member which is a girder of **H**, **T**, channel, angle or other section or a bar, a second member which is a girder of **H**, **T**, channel, angle or other section or a bar, both these members having a laminated formation of strip or sheet metal, a clip device connecting these members by parts of the clip device embracing or engaging parts of the respective members in the manner described, and indentations in each of the parts of the clip device and a member which are in engagement, each of these indentations being such as to cause the indented portions of all the superimposed layers of metal to be pressed up out of their respective planes to such an extent that the lowermost metal layer is pressed out beyond the plane of the next adjacent layer, the second and other adjacent layers being correspondingly pressed out in the manner and for the purpose described.
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 100
 105
 110
 115

2. A girder or like structure for use in the making of models or like small articles as claimed in Claim 1, in which the clip device is formed integral and is provided with lugs extending from opposite edges thereof and embracing edges of the members to be connected, indentations of the kind referred to being formed in the superimposed parts of the members and the clip device.
 120
 125

3. A girder or like structure for use in the making of models or like small
 130

- articles as claimed in Claim 1, in which the clip device comprises a number of parts which interengage when assembled to form the complete clip device parts of which embrace the edges of the members to be connected. 5
4. A girder or like structure for use in the making of models or like small articles, comprising parts joined together substantially as described with reference to Figure 1, or Figure 2, or Figure 3, or Figure 4, or Figure 5, or Figure 6, or Figure 7, or Figure 8, or Figure 9, or Figure 10 of the accompanying drawings. 10
- Dated this 29th day of April, 1931.
KILBURN & STRODE,
Agents for the Applicants.

368,131 COMPLETE SPECIFICATION

[This Drawing is a reproduction of the Original on a reduced scale.]

FIG. 1.

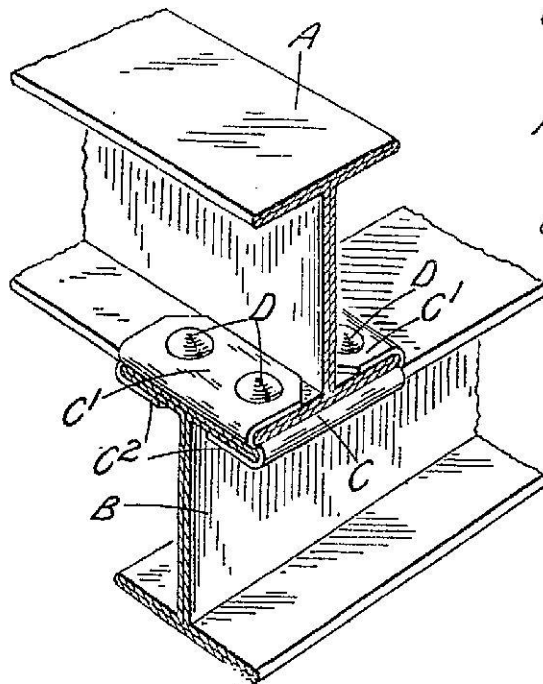


FIG. 2.

SHEET 1

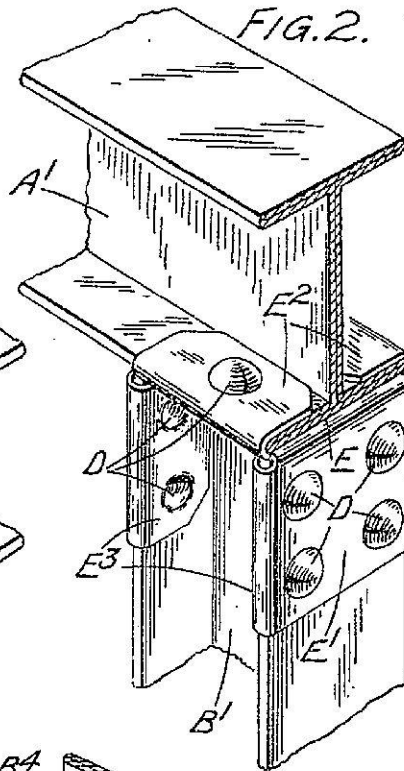


FIG. 3.

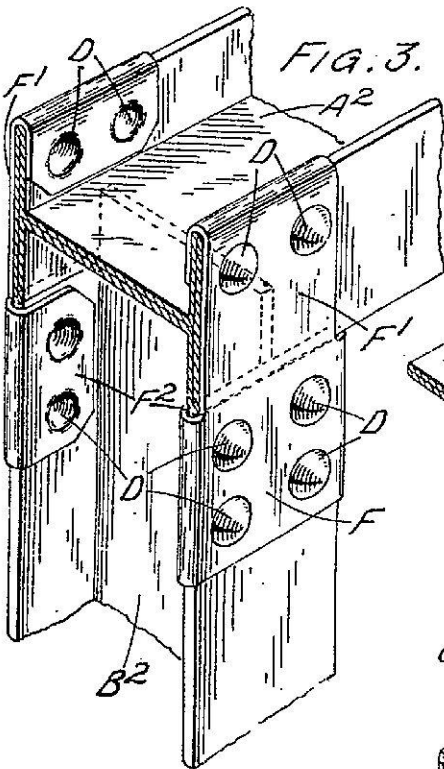


FIG. 5.

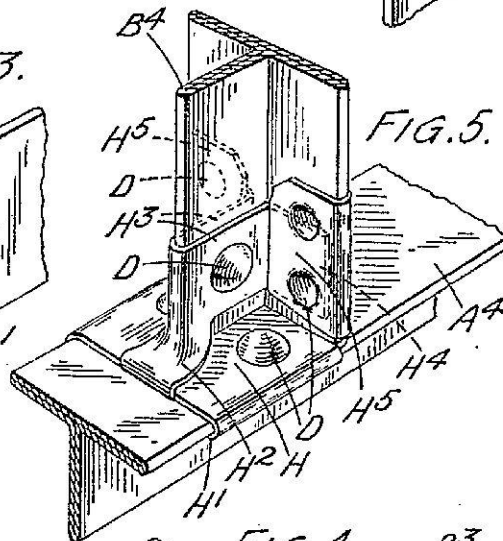


FIG. 4.

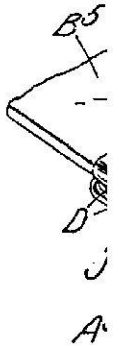
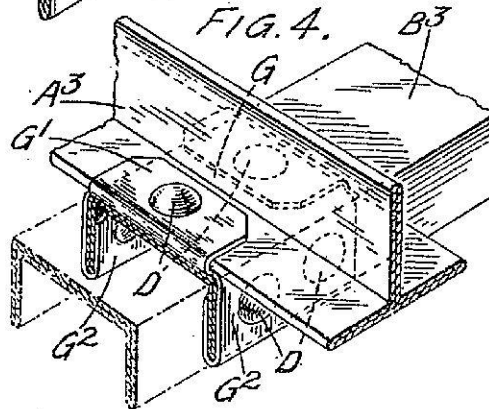
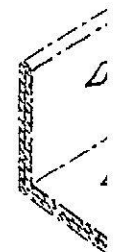
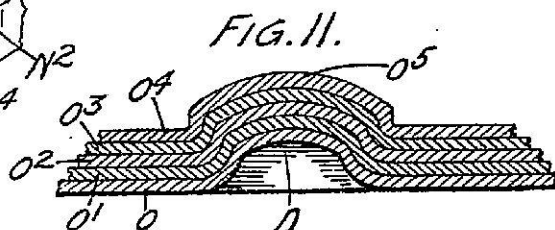
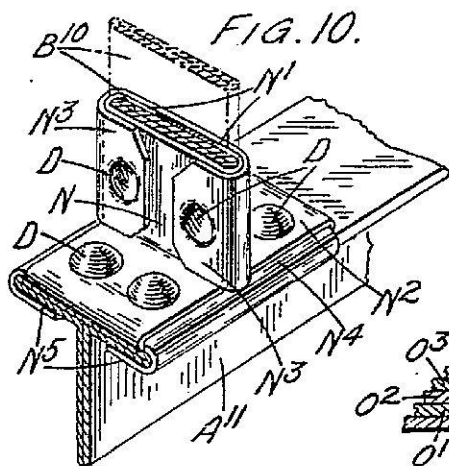
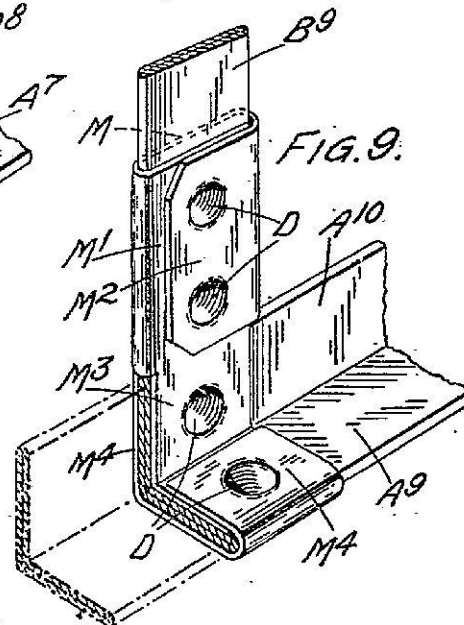
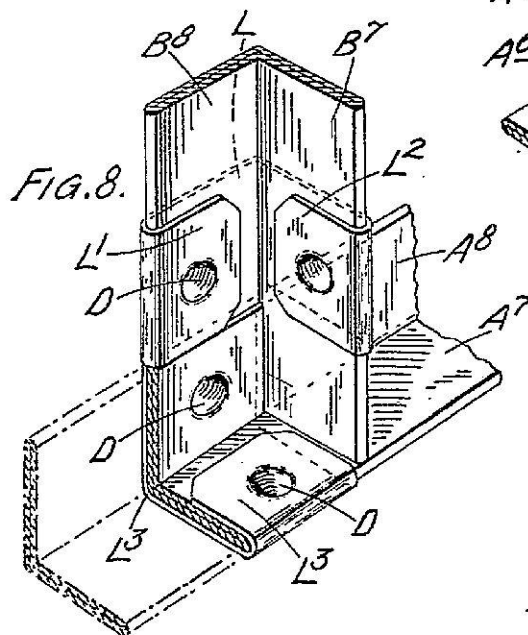
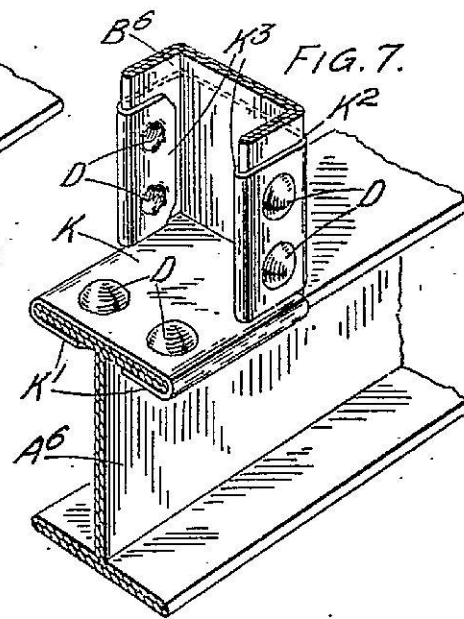
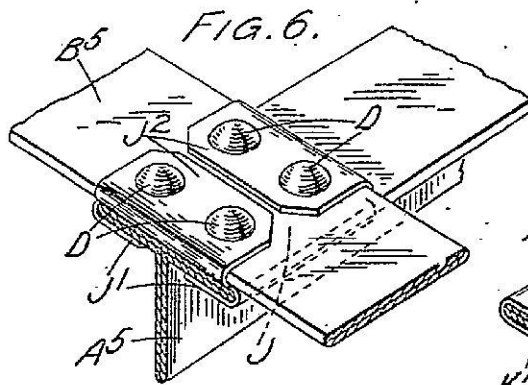


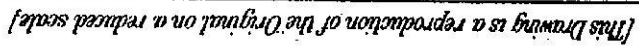
FIG. 6.

L1.
D

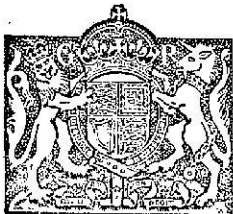


B10
N3
D
N-
D
N5





PATENT SPECIFICATION



Application Date: April 29, 1931. No. 12,653/31.

368,132

Complete Accepted: March 3, 1932.

COMPLETE SPECIFICATION.

Improvements in or relating to Clip Devices for Use in the Making of Models or like Small Structures.

We, MANUFAX LIMITED, a Company registered under the Laws of Great Britain, of 38, Felsham Road, Putney, London, S.W.15, and FREDERICK DONALD LANGWOOD, British Subject, of 70, The Lawn, Shepherd's Bush, London, W.12, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to clip devices formed integral from sheet metal for use in the making of models or like small structures and has for its object to provide a clip device for connecting together girders of H- or I-section, members of T-, channel- or angle-section and tie bars or similar members formed of strip or sheet metal, which will be simple in construction and operation and will provide a rigid connection. For the sake of convenience members of the kind which clip devices according to this invention are adapted to connect will be hereinafter referred to as girder or similar members.

According to the present invention a clip device for use in the making of models or like small structures and for connecting together, without perforation of the parts, girders or similar members formed of strip or sheet metal, is formed integral of sheet metal comprising two flat main or body portions of similar dimensions which can be folded together to lie face to face with a space between them in which a flat portion of each girder member can be placed, and at least one extension or lug on one body portion which lug can be folded over the other body portion so as to lie on or embrace the latter thus locking one body portion to the other and providing superimposed parts of the clip device with interposed portions of the girder members all adapted to be simultaneously embossed in such a manner that the base of the indentation in the part of the clip device constituting one outside layer of the superimposed parts is pressed into or beyond the plane in which lies the part of the clip device constituting the other outside layer of the superimposed parts.

[Price

The clip device may take various forms but in one form the two main or body portions of the device have a width substantially equal to the width of the girder member which they are adapted to embrace, the connection between the two body portions of the device extending from one end thereof over only a portion of their length so that when folded along their line of connection parts of the two body portions will lie spaced apart and parallel, permitting the interposition between them of a part of a girder member, one of the body portions having a lateral lug which when folded over will embrace the edge portion of the girder member interposed between the connected body portions, the superimposed parts of the device with the interposed portion of the girder member all being adapted to be embossed in the manner described. The unconnected end portions of the clip device each have an outwardly turned lug adapted to lie against the face of the flange of a second girder member whose web is interposed between these end portions of the clip device, a separate member folded to a flattened C-shape embracing the edges of the second girder flange and lying over the said outwardly directed lugs so that these superimposed parts can be simultaneously embossed in the manner described, thereby forming a rigid joint.

In an alternative construction the two main or body portions of the clip device have a similar Y-shape with their line of connection along the foot of the Y, the two portions of the clip when folded back embracing and extending from one edge portion of an interposed girder member, these superimposed parts all being adapted to be simultaneously embossed in the manner described. The arms of the two main Y-shaped parts of the clip device which then project laterally from the said first girder member are respectively adapted to have interposed between them two other and separate girder members, each arm of one of these body portions of the device having one or more lateral lugs each of which when folded over onto the corre-

spending other body portion embraces the edge portion of the interposed girder member, thus providing superimposed parts of the clip device with interposed portions of the members all adapted to be simultaneously embossed in the manner described to form a rigid joint.

The invention may be carried into practice in various ways but three alternative constructions of clip device according to this invention and the manner in which they may be used are illustrated by way of example in the accompanying drawings, in which

Figure 1 shows a blank for forming one form of clip device according to this invention,

Figure 2 shows a clip device formed from the blank shown in Figure 1,

Figure 3 shows how the clip device shown in Figure 2 may be employed in practice,

Figure 4 shows a blank for forming an alternative construction of clip device according to this invention,

Figure 5 shows a clip device formed from the blank shown in Figure 4,

Figure 6 illustrates how the clip device shown in Figure 5 may be employed in practice,

Figure 7 shows a blank for forming a still further construction of clip device according to this invention,

Figure 8 shows a clip device formed from the blank shown in Figure 7, while

Figure 9 shows how a small structure may be built up from a combination of girders with clip devices according to this invention as shown in Figures 1 to 8.

In the construction shown in Figures 1, 2 and 3, the clip device is formed integral from sheet metal and comprises two main parts A, A' connected together for part of their lengths along the line B and separated by a slot A² for the remainder of the lengths, the part A' being provided with a laterally projecting lug C. The clip device is formed from the blank shown in Figure 1 by folding the main parts along the line B so that these main parts will be spaced apart and parallel to one another as shown in Figure 2. The lug C is also bent as shown in Figure 2 so as to lie at an angle to the planes in which lie the main parts A and A', while the end portions A² of the portions of the device which are separated by the slot A² are also bent outwards to form outwardly turned lugs.

This clip device may be employed in practice as shown in Figure 3. Thus the end portion of a tie-bar or girder D may be interposed between the connected portions of the main parts A and A' so that

these portions embrace one edge of this tie bar. The lateral lug C is then folded over as shown so as to embrace the other edge of the tie bar D and the superimposed parts C, A and A' of the clip device with the portion of the tie bar D between them are then simultaneously embossed in the manner described as shown at E. The lug-like end portions A² of the main parts of the clip device lie against the flange D' of a second girder D², the web of which is interposed between these end portions, and a separate member F, shown in Figure 2, is folded over into a flattened C-shape as indicated by dotted lines in Figure 3 so as to embrace the edges of the flange D' of the girder D² and to lie over the outwardly directed lugs A², the superimposed parts F, A², and D' being then simultaneously embossed as shown at E', in the manner described.

In the alternative construction of clip device shown in Figures 4, 5 and 6, the clip device is formed from the blank shown in Figure 4 comprising two main parts G, G' having a similar Y-shape connected along the foot of the Y. The arms G² of one part G, of the Y-shaped main parts are each provided with two laterally projecting lugs G³, G⁴.

In forming the clip device from the blank shown in Figure 4, the two Y-shaped parts are folded together about the dotted line G⁵ and the lugs G³, G⁴ on each arm of the part G are bent upwards so as to lie parallel to one another and on either side of the corresponding edges of the arms of the other Y-shaped part G', as shown in Figure 5.

A clip device as shown in Figures 4 and 5 is conveniently employed to connect together three girders or tie bars as shown in Figure 6. Thus the main parts G, G' of the clip device embrace one tie bar H with the arms of the Y-shaped parts extending laterally from this tie bar, the superimposed parts G, G' of the clip device with the tie bar H between them being simultaneously embossed in the manner described, as shown at E². Interposed between the spaced parallel arms of the two main parts of the clip device are two further girder members or tie bars H¹, H², the lugs G³, G⁴ being folded over the edges of these tie bars so as to embrace them and lie one on top of the other as shown, the superimposed parts of the clip device with the tie bars between them then being simultaneously embossed in the manner described as shown at E³ to form a rigid joint.

In the alternative construction of clip device shown in Figures 7 and 8, the clip device is formed from a blank as shown

in Figure 7 comprising two similar main parts J, J¹ joined together along the dotted line J² and partly separated by a slot J³. The part J is provided with a laterally extending lug K. The clip device is formed from the blank shown in Figure 7 by folding the parts together along the dotted line J² so that the main parts lie parallel to one another with a space between them, as shown in Figure 8. The lug K is bent as shown and portions J⁴, J⁵ of the clip device are bent outwards along the dotted lines J⁶ so as to lie at right angles to the main parts of the clip device and form two outwardly extending lugs.

The manner in which the clip device shown in Figures 7 and 8 may be employed is shown in Figure 9, where it is employed to connect a T-section girder L to a tie bar L¹. In this arrangement the tie bar L¹ is interposed between the connected portions of the main parts of the clip device so that the clip device embraces one edge of this tie bar. The lug K is then folded over the other edge as shown and the superimposed parts of the clip device with the tie bar between them are embossed in the manner described as shown at E⁴. The two lugs J⁴, J⁵ lie against the face of the flange of the T-section girder L, whose web member is interposed between these lugs, and separate members similar to the member F shown in Figure 2 are bent into flattened C-shape so as to embrace the edges of the flange of the girder member L and lie over these outwardly directed lugs J⁴, J⁵, so that the superimposed parts of the member F and lugs J⁴, J⁵ with the girder flange between them can be simultaneously embossed in the manner described, as indicated at E⁵, to form a rigid joint.

Figure 9 also shows how the clip devices shown in Figures 1, 2 and 3 and in Figures 4, 5 and 6 may be employed to connect together girders and tie bars to form a girder structure suitable for example for supporting the roof of a miniature building.

It is to be understood that the constructions described above are given by way of example only and that constructional details may be modified without departing from this invention.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A clip device for use in the making of models or like small structures and for connecting together, without perforation of the parts, girders or similar members

formed of strip or sheet metal, the device formed integral of sheet metal comprising two flat main or body portions of similar dimensions which can be folded together to lie face to face with a space between them in which a flat portion of each girder member can be placed, and at least one extension or lug on one body portion which lug can be folded over the other body portion so as to lie on or embrace the latter thus locking one body portion to the other and providing superimposed parts of the clip device with interposed portions of the girder members all adapted to be simultaneously embossed in the manner described thereby forming a rigid joint.

2. A clip device as claimed in Claim 1, in which the two main or body portions of the device have a width substantially equal to the width of the girder member which they are adapted to embrace, the connection between the two body portions of the device extending from one end thereof over only a portion of their length so that when folded along their line of connection parts of the two body portions will lie spaced apart and parallel, permitting the interposition between them of a part of a girder member, one of the body portions having a lateral lug which when folded over will embrace the edge portion of the girder member interposed between the connected body portions of the device, these superimposed parts of the clip device with the interposed portion of the girder member all being adapted to be simultaneously embossed in the manner described, the unconnected end portions of the clip each having an outwardly turned lug adapted to lie against the face of the flange of a second girder member whose web is interposed between these end portions of the clip device, a separate member folded to a flattened C-shape embracing the edges of the second girder flanges and lying over the said outwardly directed lugs so that these superimposed parts can be simultaneously embossed in the manner described, thereby forming a rigid joint.

3. A clip device as claimed in Claim 1, in which the two main or body portions of the device have a similar Y-shape with their line of connection along the foot of the Y, the two parts of the clip when folded together embracing and extending from one edge portion of an interposed girder member, these superimposed parts being all adapted to be simultaneously embossed, the arms of the two main portions of the clip device which then project laterally from the said first girder member being respectively adapted to have interposed between them two other and separate girder members, each arm of one

of these main portions of the device having one or more lateral lugs each of which, when folded over on to the corresponding other main portion of the device, embracing the edge portion of the interposed girder member, thus providing superimposed parts of the clip device with interposed portions of the members all adapted to be simultaneously embossed in the manner described, thereby forming a rigid joint.

4. A blank for forming a clip device for use in the making of models or like small structures and for connecting together, without perforation of the parts, girders or similar members formed of strip or sheet metal substantially as described and illustrated in Figure 1 or

in Figure 4 or in Figure 7 of the accompanying drawings.

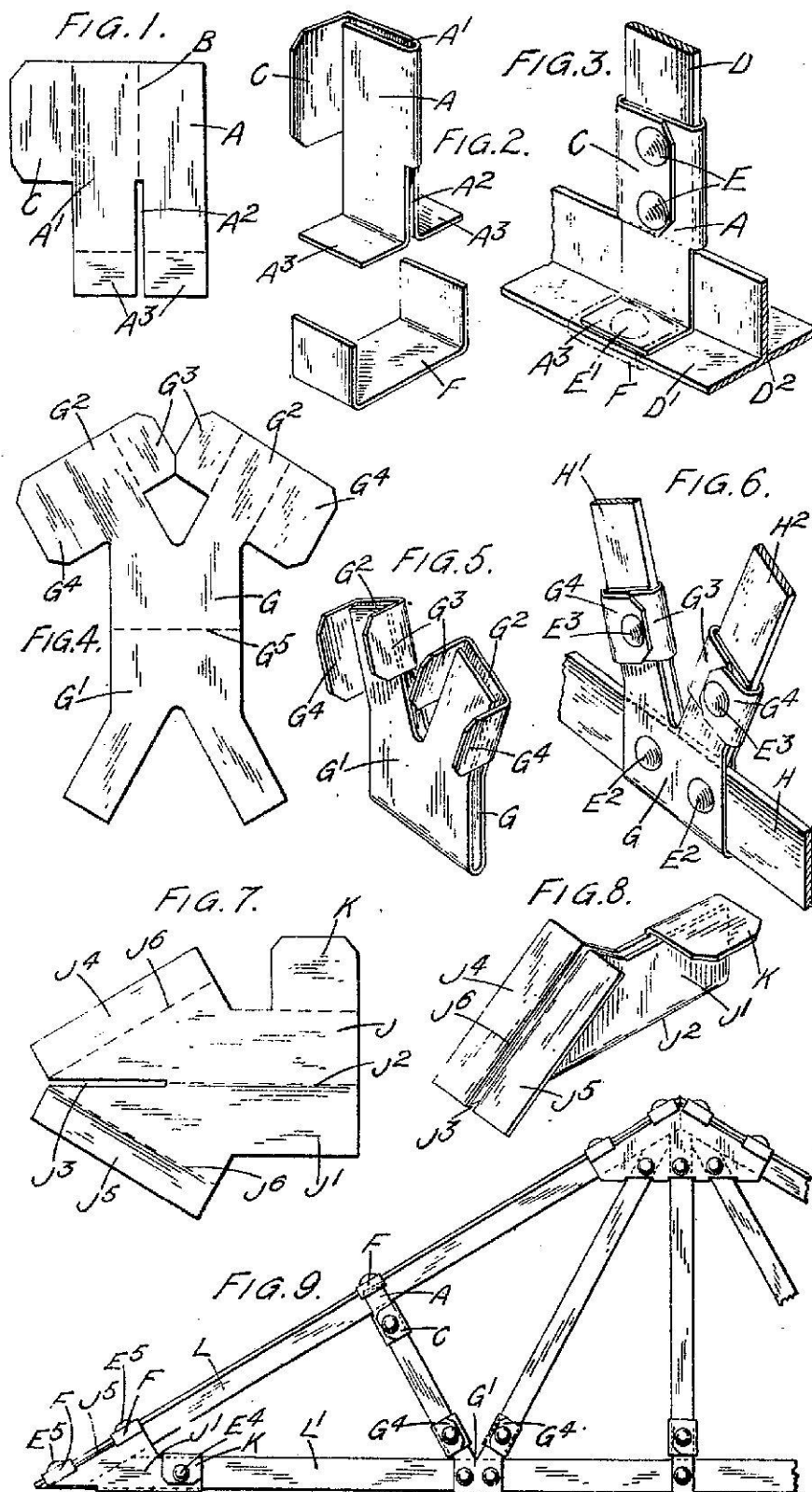
5. A clip device for use in the making of models or like small structures and for connecting together, without perforation of the parts, girders or similar members formed of strip or sheet metal substantially as described and illustrated in Figure 2 or in Figure 5 or in Figure 8 of the accompanying drawings.

6. Miniature structures having parts connected together by clip devices substantially as illustrated in Figure 3 or in Figure 6 or in Figure 9 of the accompanying drawings.

Dated this 29th day of April, 1931.

KILBURN & STRODE,
Agents for the Applicants.

Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1932.



[This Drawing is a reproduction of the Original on a reduced scale.]

PATENT SPECIFICATION



Application Date: May 12, 1931. No. 14,052/31.

368,591

Complete Accepted: March 10, 1932.

COMPLETE SPECIFICATION.

Improvements in or relating to Clip-like Devices or Attachments for Use in the Making of Models or like Small Structures.

We, MANUFAX LIMITED, a Company registered under the Laws of Great Britain, of 38, Felsham Road, Putney, London, S.W.15, and FREDERICK DONALD LINGWOOD, British Subject, of 70, The Lawn, Shepherd's Bush, London, W.12, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to clip-like devices or attachments for use in the making of models or like small structures, and has for its object to provide a device or attachment for connecting a rod-like member to a part such as a girder formed of strip or sheet metal.

The device or attachment according to the present invention comprises a strip of sheet metal having opposite longitudinal margins cut away or cut and folded to provide a part of reduced width and form at least one pair of lugs projecting from the opposite edges of the remaining part or parts, the part of reduced width being bent to form an integral cylindrical sleeve which extends transversely to the length of the strip and is adapted to receive a rod or the like, so that when the surface of the device between each pair of lugs is placed in contact with a face of the girder flange or the like the lugs can be folded over opposite edges of this flange whereupon the device can be secured in position by embossing into each other the superimposed layers of metal comprised in the lugs, the part of the device between the lugs and the interposed parts of the member on which the device is mounted, this embossing being effected in such a manner as to cause the indented portions of the superimposed layers of metal to be pressed up out of their respective planes to such an extent that the lowermost metal layer is pressed out beyond the plane of the next adjacent layer, the second and other adjacent layers each being correspondingly pressed out beyond the plane of the layer lying immediately above it.

The part of reduced width, may be bent
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into a V-shape with the cylindrical sleeve formed at the apex of the V, the arms of this V-shaped portion being inclined to and terminating in flat parts adapted to lie in contact with a face of the girder or other part on which the device is mounted, each of these flat parts having lugs adapted to be folded over and embrace opposite edges of the girder member. If desired in such an arrangement a clip-like strap may extend between the arms of the V-shaped portions adjacent to the sleeve at the apex.

Alternatively, the longitudinal edges of one end of the strip of sheet metal may be cut away to form a tongue and to provide at least one pair of lugs projecting from opposite edges at or near the other end, the tongue being bent to form a cylindrical sleeve with the free end of the tongue bent back so as to lie between the face of the portion of the device between the lugs and the adjacent face of the girder or like member on which the device is mounted.

The invention may be carried into practice in various ways but five alternative constructions according to this invention are illustrated by way of example in the accompanying drawings, in which

Figure 1 is a perspective view of one form of clip device or attachment according to this invention,

Figure 2 shows the blank from which the device shown in Figure 1 is formed,

Figure 3 is a side elevation of the device shown in Figure 1 with a strap device cooperating with it,

Figure 4 is a similar view to Figure 1 of an alternative form of attachment according to this invention,

Figure 5 is a perspective view of a further form of attachment according to this invention,

Figure 6 shows the blank from which the attachment shown in Figure 5 is formed,

Figures 7 and 8 shown two alternative forms of attachment according to this invention, and

Figure 9 shows in cross-section the form of the indentations employed in

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structures employing attachments or devices according to this invention.

In the construction shown in Figure 1 employing the blank shown in Figure 2, the attachment is shown as applied to an I-section girder A having a laminated formation of sheet metal. The attachment comprises a strip of sheet metal the end portions B of which lie in contact with the lower flange of the girder A while an intermediate part B¹ of reduced width forms a V-shaped portion as shown, at the apex of which is formed a sleeve B². As shown in Figure 2 the intermediate part B¹ with the sleeve B² at the apex is formed of double thickness by folding inwards the sides B³ of the portion of the blank from which this part of the attachment is formed.

The end portions B of the main part of the device are provided with lugs B⁴ which are folded over and embrace opposite edges of the flange of the girder A as shown, the superimposed parts B and B⁴ with the flange of the girder A between them being embossed as shown at C in the manner indicated in Figure 9, so that the indented portions of the superimposed layers of metal are pressed out of their respective planes to such an extent that one outside metal layer is pressed out beyond the plane of the next adjacent layer the second and other adjacently pressed out beyond the plane of the layer immediately next to it so that the indentations prevent relative movement between the parts of the attachment and the girder flange.

When applying a clip device or attachment of the kind described above to a girder it will be seen that by sliding the parts B towards or away from one another before embossing these parts as shown at C the distance of the sleeve from the girder flange can be varied and adjusted before the parts B are finally secured, by embossing, to the girder flange.

In the construction shown in Figure 3 an attachment of the kind shown in Figure 1 has applied to it a clip-like strip D extending between the parts B¹ as shown and having lugs D¹ which embrace the edges of these parts, one of these lugs being shown in the position it occupies before being folded over the edge of the adjacent part B¹.

In the construction shown in Figure 4 the attachment is applied to one flange of an I-section girder A having a laminated formation of sheet metal and comprises a main part F from the opposite edges of the end portions E of which extend lugs E¹ which are bent over and embrace the

edges of the adjacent flange of the girder A. Formed integral with and lying between these end portions E is a part of reduced width which is bent to form a sleeve E² as shown, this sleeve being formed of two layers of metal by turning in the edge portions of the blank from which the attachment is made before forming the sleeve. The superimposed parts of the main part E and of the lugs E¹ of the attachment with the interposed flange of the girder A are embossed in the manner indicated in Figure 9 as shown at C so as to connect the attachment rigidly to the girder.

In the construction shown in Figures 5 and 6 the attachment is shown as applied to one flange of an I-section girder A having a laminated formation of sheet metal, and is formed from a substantially H-shaped blank as shown in Figure 6. The device comprises main parts J constituting the sides of the H and adapted to lie in contact with the face of the flange of the girder A, the ends of these parts constituting lugs J¹ which are bent round and embrace the edges of this flange, while a portion of reduced width J² between the lugs is bent to form a sleeve lying between and formed integral with these main parts. The superimposed parts of the main parts J and of the lugs J¹ of the attachment with the interposed flange of the girder A are embossed in the manner indicated in Figure 9 as shown at C so as to connect the attachment rigidly to the girder.

In the construction shown in Figure 7 the attachment is shown as applied to an I-section girder A having a laminated formation of sheet metal, and comprises a main part K from one pair of opposite edges of which extend lugs K¹ which are folded over to embrace the edges of the flange of the girder A. From one of the other pair of opposite edges of the main part K extends a portion of reduced width in the form of a tongue the part of which lying adjacent to the main part is bent to form a sleeve K² while its end K³ extends beneath the main part K and between it and the flange of the girder A. The superimposed parts K, K² and K¹ of the device with the interposed flange of the girder A are embossed in the manner indicated in Figure 9 as shown at C.

In the construction shown in Figure 8 the attachment is somewhat similar to that shown in Figure 7 and comprises a main part L from one pair of opposite edges of which extend lugs L¹ which are bent over to embrace the adjacent edges of the flange of the girder A. From one of the other pair of opposite edges of the

main part L extends a portion of reduced width in the form of a tongue the part L² of which lying adjacent to the main part L extends parallel to the flange of the girder A. At the end of the part L³ remote from the part L the tongue is bent to form a sleeve L³ and the end L⁴ of the tongue extends back underneath the part L² and the main part L between these parts and the flange of the girder. The superimposed parts L, L⁴ and L¹ of the attachment with the interposed flange of the girder A and also the superimposed parts L², L⁴ and the girder flange are embossed as shown at C in the manner indicated in Figure 9.

Figure 9 shows the general form of the indentations C employed in structures according to this invention as shown, for example, in Figures 1, 2, 3, 4, 5, 6, 7 and 8 of the accompanying drawings, the indentations C being shown in Figure 9 as formed in superimposed parts comprising in all five layers M, M¹, M², M³ and M⁴ of sheet metal. It will be seen that the layer M is pressed up at C out of its plane to a point beyond the plane in which lies the main part of the layer M¹, while similarly each of the other layers M¹, M², M³ is pressed up at C out of its plane to a point beyond the plane in which lies the layer immediately above it, the form of the indentation in the layer M⁴ being such that its outer convex surface M⁵ resembles a miniature rivet head or bolt head. Thus the indentations tend to give to the structures an appearance of having the various parts constituting them riveted or bolted together.

It is to be understood that the constructions illustrated are given by way of example only and may be modified without departing from this invention.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A clip-like device or attachment for connecting a rod-like member to a part such as a girder formed of strip or sheet metal the whole being for use in the making of models or like small structures, the device or attachment comprising a strip of sheet metal having opposite longi-

tudinal margins cut away or cut and folded so as to provide a part of reduced width and form at least one pair of lugs projecting from the opposite edges of the remaining part or parts, the part of reduced width being bent to form an integral cylindrical sleeve which extends transversely to the length of the strip and is adapted to receive a rod or the like, so that when the surface of the device between each pair of lugs is placed in contact with a face of the girder flange or the like the lugs can be folded over opposite edges of this flange whereupon the device can be secured in position by embossing into each other in the manner described the superimposed layers of metal comprised in the lugs, the part of the device between each pair of lugs and the interposed portions of the member on which the device is mounted.

2. A clip-like device or attachment as claimed in Claim 1 in which the part of reduced width is bent into a V-shape with the cylindrical sleeve at the apex of the V, the arms of this V-shaped portion being inclined to and terminating in flat parts adapted to lie in contact with a face of the girder or other part on which the device is mounted each of these flat parts having lugs adapted to be folded over and embrace opposite edges of the girder member.

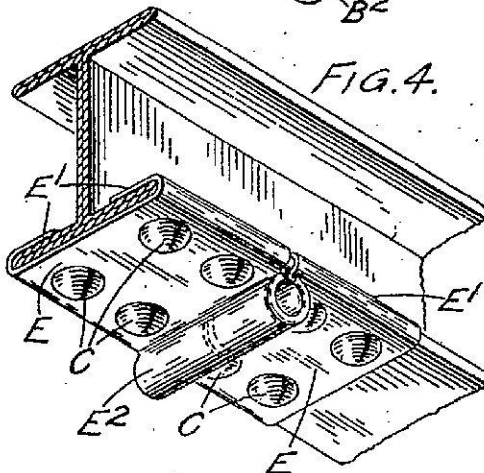
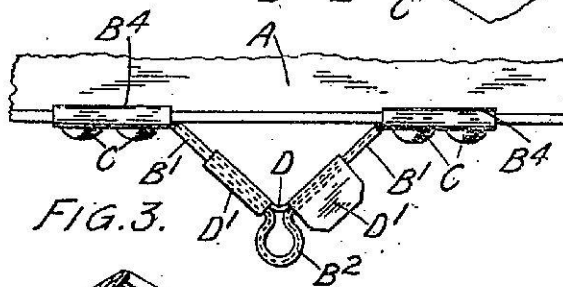
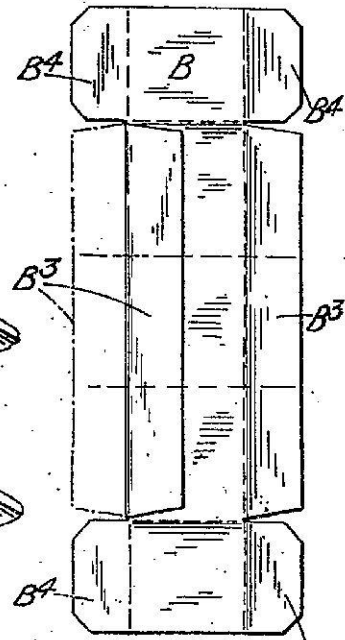
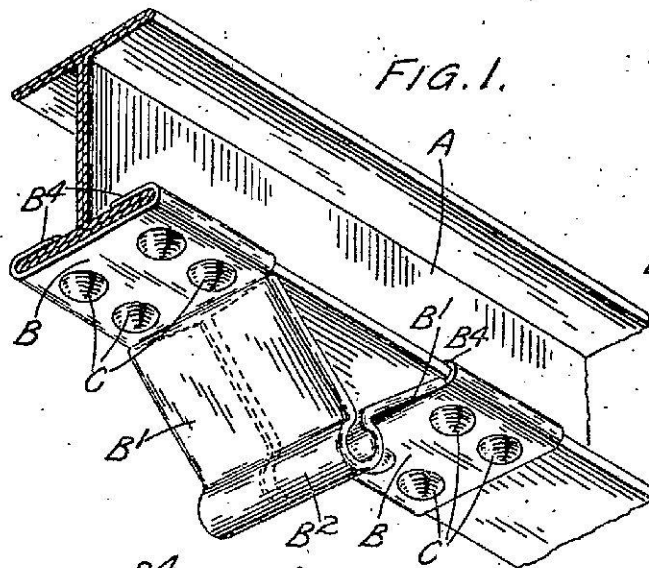
3. A clip-like device or attachment as claimed in Claim 1 in which the longitudinal edges of one end of the strip of sheet metal are cut away to form a tongue and to provide at least one pair of lugs projecting from opposite edges at or near the other end, the tongue being bent to form a cylindrical sleeve with the free end of the tongue bent back so as to lie between the face of the portion of the device between the lugs and the adjacent face of the girder or like member on which the device is mounted.

4. A clip device or attachment substantially as described with reference to Figures 1 and 2 or Figure 3 or Figure 4 or Figures 5 and 6 or Figure 7 or Figure 8 of the accompanying drawings.

Dated this 12th day of May, 1931.

KILBURN & STRODE,
Agents for the Applicants.

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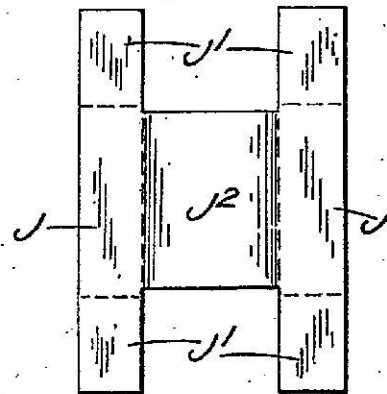
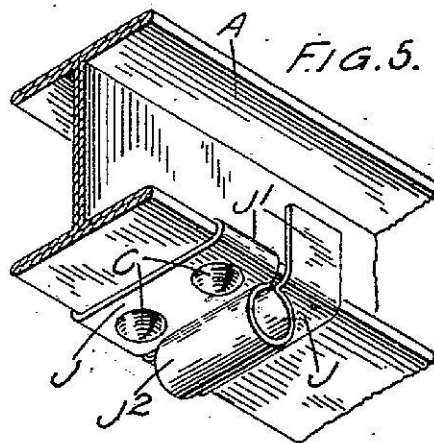
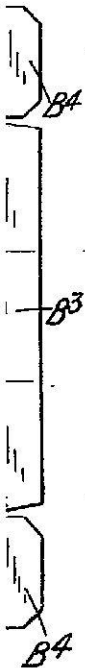
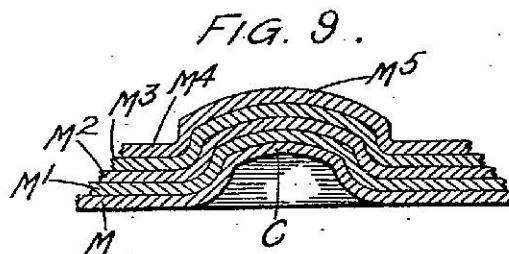
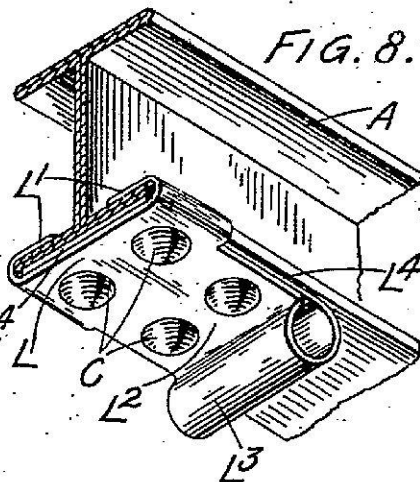
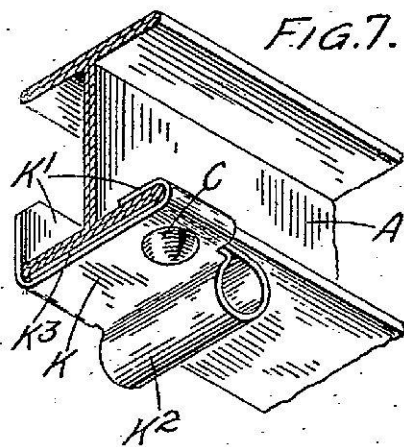
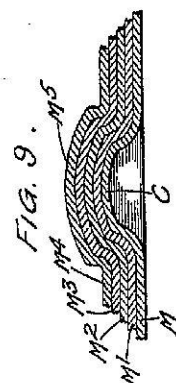
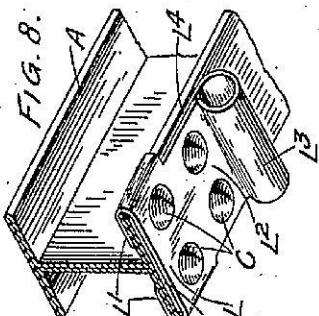
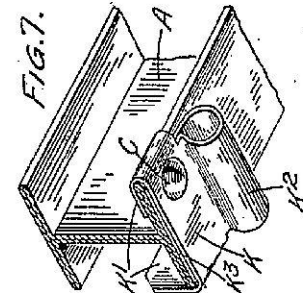
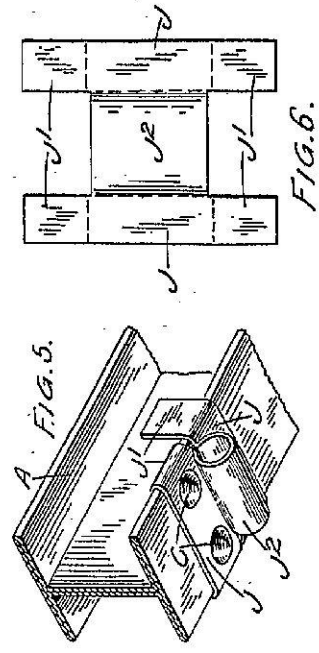
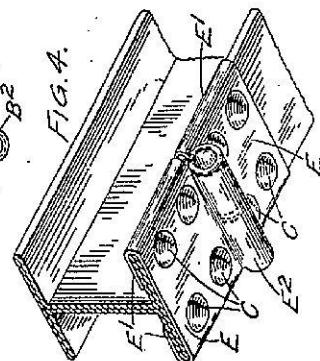
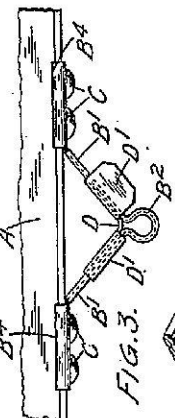
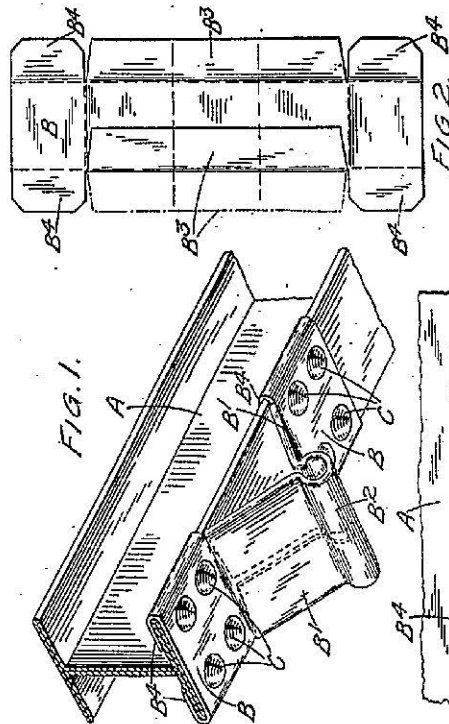


FIG. 6.





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12060. *Girders for models.* MANUFAX LIMITED, 38 Felsham Road, Putney, London, S.W.15, England. (In part assignees of Frederick Donald Lingwood, 70, The Lawn, Shepherd's Bush, London, W.12, England). July 29, 1931. (4047). Date accorded under International Convention: Apr. 29, 1931 (Great Britain).

This invention relates to girder or like structures for use in the making of models or like small articles, and has for its object to provide a form of structure which will be of a simple and rigid nature, will be capable of being readily assembled and will have an appearance somewhat similar to larger girder structures.

In the construction shown in the Figure the structure comprises an I-section girder A having a laminated formation of sheet metal, the lower flange of which rests on the upper flange of a second I-section girder B also having a laminated formation of sheet metal and disposed at right angles to the girder A.

Interposed between the adjacent flanges of the two girders is a clip device comprising a body part C of rectangular form from one pair of opposite edges of which extend lugs C¹ which are bent over the adjacent edges of the lower flange of the girder A. From the other pair of opposite edges of the body part C

extend lugs C² which are bent over and embrace the edges of the upper flange of the girder B.

Indentations D are formed in the super-imposed portions of the clip device and the girder flanges embraced thereby, these indentations being formed as shown in Fig. 11, so

FIG. I.

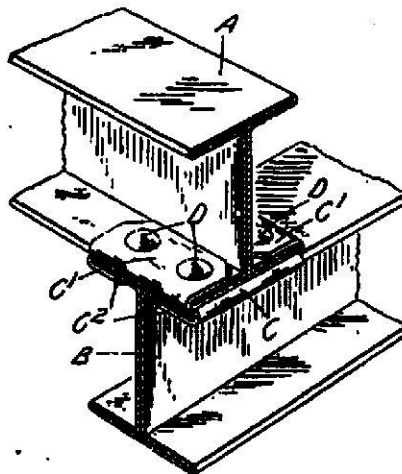


FIG. II.



that each layer of metal is pressed out of its plane to such an extent that the pressed-out portion extends beyond the plane in which lies the main part of the next adjacent layer of metal.

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