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Angled gutter downpipe or downpipe connector and method of manufacturing the same

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(71) Applicant(s)
Fielders Australia Pty Ltd

(72) Inventor(s)
Blaik, Kevin

(74) Agent / Attorney
Lesicar Perrin, 49 Wright Steet, Adelaide, SA, 5000

ABSTRACT

The present invention relates to a gutter downpipe having at least one bend, or an angled downpipe connector, and also to a method of manufacturing such components. In particular, the present invention provides a means of enabling a strip of metal to be roll formed into a downpipe structure notwithstanding that the strip has at least one cutout section along its length which allows the downpipe to be bent or angled subsequent to roll forming.

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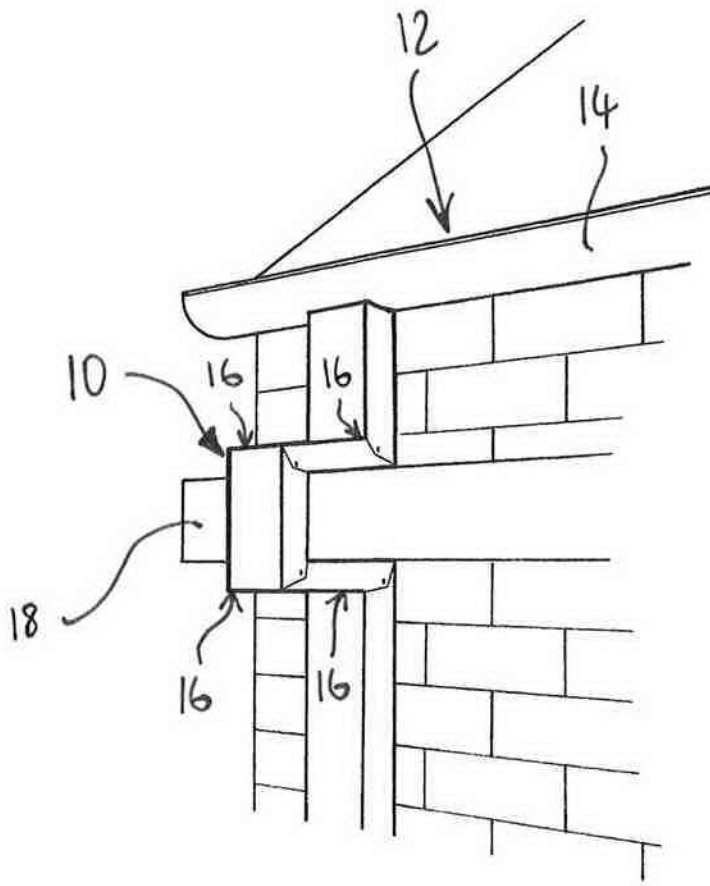


Fig 1

Angled gutter downpipe or downpipe connector and method of manufacturing the same

The present invention relates to a gutter downpipe having at least one bend, or an angled downpipe connector, and also to a method of manufacturing such components. In particular, the present invention provides a means of enabling a strip of metal to be roll formed into a downpipe structure notwithstanding that the strip has at least one cutout section along its length which allows the downpipe to be bent or angled subsequent to roll forming.

BACKGROUND OF THE INVENTION

Building structures are routinely provided with any of a variety of different gutter systems for accommodating water resulting from various weather conditions such as rain and snow.

Such gutter systems operate to receive water collected from roof portions of the structure, and to channel that water into one or more generally vertical downpipes for bringing the collected water down to ground level. It is well known for portions of a gutter downpipe to be angled, for example, to travel around obstacles or for directing water away from the structure.

Typically, an angled connector member is used to join a first length of downpipe with a second length of downpipe to enable them to extend at different angles. A known process for constructing an angled downpipe connector of this type is as follows:

- (a) scribing the outline of the connector blank onto a flat sheet of metal, the blank being substantially rectangular and including two symmetrical side cutouts approximately halfway along the length, the final angle of the connecting member being determined by the shape of the cutouts;
- (b) cutting the flat sheet of metal along the scribe lines typically using a cutting machine for larger cuts and a manual cutting means such as tin snips for more precise cuts to form the blank;
- (c) folding the blank along longitudinally extending fold lines one by one until the hollow cross sectional shape of the downpipe is substantially formed and two longitudinal side edges meet along the centre of the pipe;
- (d) crimping the two longitudinal side edges together along the length of the pipe to thereby form a closed hollow cross section;

- (e) folding the pipe along a transversely extending fold line extending between the cutouts to thereby angle the member; and
- (f) locking the member at an appropriate angle using a suitable fastening means such as rivets.

5 The reader will appreciate that this manual process of forming an angled downpipe connector is laborious and expensive. Even once completed, the various manufactured components still need to be assembled onsite. The present Applicant has recognised the need for a more efficient method of constructing angled downpipes.

0 It is an object of the present invention to overcome the aforementioned problems, or at least provide the public with a useful alternative.

SUMMARY OF THE INVENTION

5 Therefore in one form of the invention there is proposed a downpipe for a gutter system including a first downpipe portion extending at a first angle and a second downpipe portion extending at a second angle, said first and second downpipe portions being of a single piece, roll formed construction.

20 In a further form of the invention there is proposed a downpipe connector for a gutter system adapted to join a first and second downpipe at different angles, said downpipe connector including a first downpipe portion extending at a first angle and a second downpipe portion extending at a second angle, said first and second downpipe portions being of a single piece, roll formed construction.

25 In a still further form of the invention there is proposed a downpipe blank comprising: a longitudinal strip of material including two outer edges and longitudinally extending fold lines, said strip adapted to be folded along said fold lines to thereby form said downpipe cross section;

a punched out section disposed inside of said two outer edges, said punched out section enabling said downpipe to be bent to a predetermined angle after it has been folded along said fold lines; and

wherein said punched out section is such that material is not punched out along said longitudinal fold lines.

In maintaining tabs of material along each of the longitudinal fold lines, the punched out section is reinforced and is able to undergo roll forming which would otherwise jeopardise the structural integrity of the strip.

5 Preferably said downpipe is adapted to be rectangular in cross section, said blank including two innermost fold lines and two outer fold lines, a first area between the innermost fold lines defining a front downpipe surface, a second area between the inner and outer fold lines forming two side downpipe surfaces, and a third area between the outer fold lines and the two outer edges defining a rear downpipe surface when the outer edges are joined.

In preference material is punched out of both the first and second areas of the blank.

0 Preferably when said blank is folded along said fold lines and the two outer edges joined, said material which was not punched out along the two innermost fold lines is adapted to be cut away.

5 In preference said punched out section in the first area includes a longitudinal tab of material that is not punched out to provide reinforcement to the first area of the blank proximate said punched out section.

In preference said punched out section in each second area is shaped in the form of a triangle having a base edge extending adjacent and parallel to the corresponding innermost fold line and an adjacent edge extending to the corresponding outer fold line.

20 In preference the apex angle of the triangle dictates the extent to which the downpipe can be bent once folded.

Preferably said triangle is a right angle triangle including a perpendicular adjacent edge, resulting in an apex angle of 45 degrees and thus a downpipe bend angle of 45 degrees.

25 Alternatively said punched out section in each second area is shaped in the form of a quadrilateral having a base edge extending adjacent and parallel to the corresponding innermost fold line, a first adjacent edge extending to the corresponding outer fold line at a predetermined angle, and second and third edges extending between the base and adjacent edges such that material is present in the area between the second and third edges and an invisible hypotenuse of said base and adjacent edges, said material defining an overlapping surface when said downpipe is bent.

30 Preferably said overlapping surface facilitates fastening of said downpipe at said predetermined angle.

In preference the apex angle of the triangle defined by the base edge, adjacent edge, and invisible hypotenuse dictates the extent to which the downpipe can be bent once folded.

Preferably said triangle is a right angle triangle including a perpendicular adjacent edge, resulting in an apex angle of 45 degrees and thus a downpipe bend angle of 45 degrees.

5 In a further form of the invention there is proposed a downpipe manufactured from a downpipe blank as defined above.

In a still further form of the invention there is proposed a downpipe connector for connecting two lengths of downpipe at different angles, said downpipe connector manufactured from a downpipe blank as defined above.

0 In a yet further form of the invention there is proposed a gutter system including at least one downpipe manufactured from a downpipe blank as defined above.

In a further form of the invention there is proposed a method of manufacturing a gutter downpipe including the steps of:

- 5 (a) cutting out one or more transverse sections from a longitudinal strip of material to enable said strip of material to be bent to a predetermined angle, ensuring that material is not cut out along longitudinal fold lines;
- (b) folding said strip of material along the longitudinal fold lines and joining side edges thereof to form the gutter downpipe structure;
- (c) cutting away the material which was not cut away in step (a) along the longitudinal fold lines;
- 0 (d) bending said downpipe structure about a transverse axis at said cut out section to said predetermined angle; and
- (e) securing said downpipe structure at said predetermined angle using a fastening means.

In a yet further form of the invention there is proposed a method of manufacturing a gutter downpipe having at least one bend about a transverse axis thereof to a predetermined
25 angle, said method comprising the steps of:

- (a) identifying the position of longitudinal fold lines in a longitudinal strip of material such that when the strip of material is folded along the fold lines and two longitudinally extending outer edges are joined, the downpipe cross section is substantially formed;
- (b) feeding the longitudinal strip of material through a hole punching process to form punched
30 out sections along the length of the strip of material at locations where the downpipe is to be bent about a transverse axis, said punched out sections being disposed inside of the two outer edges and shaped to allow said downpipe to be bent to said predetermined angle, each of said punched out sections being such that material is maintained along each longitudinally extending

fold line;

(c) roll forming said longitudinal strip of material along each of said longitudinally extending fold lines;

(d) cutting a trailing and leading edge of the downpipe;

(e) joining the outer ends of the strip of material to form said downpipe cross section;

(f) cutting away the material associated with each punched out section that is maintained along each longitudinally extending fold line;

(g) bending the downpipe about said transverse axis to said predetermined angle; and

(h) fastening the down pipe at said predetermined angle.

In a still further form of the invention there is proposed a method of manufacturing a gutter downpipe connector for joining a first and second length of downpipe such that said connector has at least one bend about a transverse axis thereof to a predetermined angle, said method comprising the steps of:

(a) identifying the position of longitudinal fold lines in a longitudinal strip of material such that when the strip of material is folded along the fold lines and two longitudinally extending outer edges are joined, the downpipe connector cross section is substantially formed;

(b) feeding the longitudinal strip of material through a hole punching process to form punched out sections along the length of the strip of material at locations where the downpipe connector is to be bent about a transverse axis, said punched out sections being disposed inside of the two outer edges and shaped to allow said downpipe to be bent to said predetermined angle, each of said punched out sections being such that material is maintained along each longitudinally extending fold line;

(c) roll forming said longitudinal strip of material along each of said longitudinally extending fold lines;

(d) cutting a trailing and leading edge of the downpipe connector;

(e) joining the outer ends of the strip of material to form said downpipe connector cross section;

(f) cutting away the material associated with each punched out section that is maintained along each longitudinally extending fold line;

(g) bending the downpipe connector about said transverse axis to said predetermined angle;

and

(h) fastening the down pipe connector at said predetermined angle.

In a still further form of the invention there is proposed a method of producing downpipe components including downpipes and/or downpipe connectors for a building structure, said method comprising the steps of:

(a) inputting design data relating each downpipe and/or downpipe connector into a computing

means, said computing means adapted to translate said data into operational instructions for a hole punching machine, a roll forming machine, and a cutting machine;

(b) feeding a longitudinal strip of material through said hole punching machine to form punched out sections along the length of the strip of material at locations where each downpipe and/or downpipe connector is to be bent in accordance with said design data, each of said punched out sections being such that material is not punched out along where the material is to be folded along one or more longitudinal fold lines;

(c) feeding said longitudinal strip of material through said roll forming machine adapted to fold the strip of material along longitudinal fold lines to form the downpipe and/or downpipe connector structure in accordance with said design data; and

(d) feeding said longitudinal strip of material to the cutting machine responsible for cutting leading and trailing edges, including straight or angled edges, of each of said downpipe and/or downpipe connectors in accordance with said design data.

Preferably said method includes the further step of cutting away the material associated with each punched out section that is maintained along each longitudinally extending fold line.

In preference said method includes the further step of bending each downpipe and/or downpipe connector about a transverse axis to said predetermined angle.

In preference the method includes the further step of securing the down pipe connector at said predetermined angle.

Preferably said design data includes the number of downpipes and/or downpipe connectors required for said building structure.

In preference said design data includes dimensions of each downpipe and/or downpipe connector, including length, leading edge angle, trailing edge angle, and cross sectional shape and dimensions.

Preferably said design data includes the position and angle of bends required in any one of said downpipes or downpipe connectors.

In a further form of the invention there is proposed a downpipe produced by any one of the above methods.

In a still further form of the invention there is proposed a downpipe connector produced by the above defined methods.

In a yet further form of the invention there is proposed a gutter system including one or more downpipes or downpipe connectors produced by the above defined methods.

In a further form of the invention there is proposed a building structure including one or more downpipes and/or downpipe connectors produced by the above defined method.

5 BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate several implementations of the invention and, together with the description, serve to explain the advantages and principles of the invention. In the drawings,

- 0 Figure 1 illustrates a perspective view of an angled gutter downpipe manufactured in accordance with the present invention when in use;
- Figure 2 illustrates in perspective view a downpipe or downpipe connector blank including a punched out section for creating a single bend in the downpipe or downpipe connector;
- 5 Figure 3 illustrates in perspective view a first step in manufacturing a downpipe or downpipe connector in accordance with the invention, being the construction of a blank including punched out sections where bends are require;
- Figure 4 illustrates in perspective view a second step in manufacturing a downpipe or downpipe connector in accordance with the invention, being roll forming of the blank such that the blank is folded along predetermined longitudinal fold lines;
- 20 Figure 5 illustrates in perspective view a third step in manufacturing a downpipe or downpipe connector in accordance with the invention, being crimping longitudinal side edges of the roll formed bank to form a closed cross section;
- 25 Figure 6 illustrates in perspective view a fourth step in manufacturing a downpipe or downpipe connector in accordance with the invention, being cutting the reinforcing strips of material which extend across the punched out section;
- Figure 7 illustrates in perspective view the downpipe or downpipe connector following the fourth step shown in Figure 6;

Figure 8 illustrates in perspective view a fifth step in manufacturing a downpipe or downpipe connector in accordance with the invention, being bending of the pipe along the punched out section and locking the pipe at the required angle using a fastening means; and

5 Figure 9 illustrates in perspective view a lower downpipe portion constructed according to the present invention being inserted into an upper downpipe portion constructed according to the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

0 The following detailed description of the invention refers to the accompanying drawings. Although the description includes exemplary embodiments, other embodiments are possible, and changes may be made to the embodiments described without departing from the spirit and scope of the invention. Wherever possible, the same reference numbers will be used throughout the drawings and the following description to refer to the same and like parts.

5 The present invention relates to improvements in downpipe and downpipe connector construction. However, it is to be understood at the outset that the invention is not intended to be limited to this application alone, but could be applied to any type of pipe structure that requires one or more bends along its length.

20 Reference herein to a “downpipe” is intended to indicate a full one-piece length of downpipe extending from a gutter to (typically) a ground surface, and may include one or more bends along the way. Reference to a “downpipe” may also indicate any straight length of downpipe, without bends, which may extend between downpipe connectors for example.

25 Reference to a “downpipe connector” is intended to indicate a downpipe section which is bent and used to join two lengths of downpipe together at different angles, or perhaps a length of downpipe with a second downpipe connector, or even a second downpipe connector with a third downpipe connector. A downpipe connector could also form the end of a downpipe in which case it would be joined to a further connector and nothing else.

Reference to a “blank” herein is intended to indicate a downpipe or downpipe section which has been cut to size, and includes one or more punched out sections at desired bend locations, but is yet to undergo folding (by roll forming or otherwise).

Figure 1 illustrates a downpipe 10 according to one aspect of the present invention, forming part of a gutter system 12 which includes a gutter 14. The downpipe 10 is connected at an upper end thereof to the gutter for receiving liquid that collects in the gutter 14 as is known in the art. The downpipe 10 is of a single piece construction and requires no downpipe connectors, but the invention is not intended to be limited to only this type of downpipe configuration.

The use of a downpipe 10 of a single piece construction having at least one bend, as shown in Figure 1, was not possible using hitherto known manufacturing methods. It is to be understood however that the present invention is not intended to be limited to only downpipes of a single piece construction as shown. For example, angled downpipe connectors can also be constructed using the proposed method of manufacture.

Whilst the downpipe 10 of Figure 1 is angled at a number of locations 16 to travel around an obstacle 18, downpipes may require one or more bends for a number of other reasons and the present invention is not intended to be limited in that respect. For example, it may well be that only one bend is required adjacent the very bottom of a downpipe for diverting liquid at the ground surface.

Figures 2-8 illustrate the production and use of a downpipe or downpipe connector 10A having only a single bend.

A feature of the present invention which allows for such components to be manufactured in this way is the use of tabs 20 in the downpipe or downpipe connector blank 18, as shown in Figure 2, the tabs being formed by a punched out section 22 which allows the downpipe or downpipe connector to be appropriately bent or angled. The punch shape is such that the tabs 20 extend along internal longitudinal fold lines 24 of the downpipe which allow for the structure to be roll formed without compromising structural integrity around the punched out section.

Figure 2 illustrates a blank 26 having longitudinal fold lines, including fold lines 24, positioned like so to create a gutter having a rectangular cross section. The length of downpipe also includes a punched out section 22 at a location where a bend in the pipe is required. The skilled addressee will appreciate that the tabs 20 ensure that every longitudinal fold along lines 24 is not met with a cut out section of material, which would otherwise compromise the folding process.

The method of manufacturing a downpipe or downpipe connector in accordance with the invention will now be described step-by-step with reference to Figures 3-8. This description

relates to the formation of a downpipe connector 10A having a rectangular cross section along its length, however, it is to be understood that the invention is not intended to be limited to the manufacture of only rectangular cross-section pipes. Furthermore, the formation of only one bend is described, but it is to be understood that a length of downpipe could have multiple bends (as per the embodiment of Figure 1).

Figure 3 illustrates the same blank 26 as Figure 2, which is preferably a strip of metal such as steel after having undergone a cutting and punching process. For the purpose of brevity, the cutting and punching machines and processes are not shown or described in detail herein. In particular, the strip of material has been cut to form a leading edge 28 and a trailing edge 30 of the downpipe or downpipe connector, and has further undergone a punching process to form the section 22 described earlier. The skilled addressee would realise that if the component being manufactured is a downpipe connector for connecting two lengths of downpipe at different angles, then the distance between the leading and trailing edge would be small (say 0.2 to 1 metre). If, on the other hand, the component being manufactured is the full length of downpipe the distance may be more like 2 to 4 metres, or greater.

In both cases, particularly the latter, the location of the punched out section(s) 22 is important and it will become apparent to the reader that the various machines involved in manufacturing the downpipe (or downpipe connector) may be programmed with instructions on where to form the punched out section(s) 22 along the length of the component in accordance with home/building design data. This will be described in more detail below.

It is to be further understood that the leading and trailing edges which are cut into the strip of metal need not necessarily be a straight cut along a transverse axis, but could be cut in any manner depending on the required end configuration of the downpipe or downpipe connector being manufactured.

The shape of the punched out section 22 is important and is shaped like so for a number of reasons. The punched out section 22 includes four cutouts, namely, two internal rectangular cutouts 32 and 34 separated by a first central tab 36, and two side cutouts 38 and 40 which are separated from respective rectangular cutouts 32 and 34 by outer tabs 20. The blank 26 is symmetrical about a central longitudinal axis thereof such that cutouts 32 and 38 are a mirror image of cutouts 34 and 40. Whilst it was described earlier that the tabs 20 are adapted to extend along longitudinal fold lines 24, they may also be present simply to provide reinforcement wherever there is a cutout section of an extended dimension across an unfolded surface, central tab 36 being one such example.

In a preferred form of the invention, the cutouts 32, 34, 38 and 40 are formed in a single motion using a punching machine (not shown) having a die shaped accordingly, but each cutout could equally well be punched out individually.

Turning back to Figure 2 which shows each of the side cutouts more clearly from a top view, it can be seen that each of side cutouts 38 and 40 is a quadrilateral shape having two adjacent edges 42 and 44 extending perpendicularly to one another, and a further two edges 46 and 48 of approximately equal length which preferably extend to form equal, internal angles with edges 42 and 44 respectively. The skilled addressee would realise that it is the angle of the invisible hypotenuse between edges 42 and 44 which governs the angle of the bend in the downpipe or downpipe connector, and that although in the embodiment shown in Figure 3 this angle is approximately 45 degrees (to create a 45 degree bend), other angles could be punched out so as to form alternate bends. The skilled addressee would further realise that if the length of edge 42 of each side cutout is increased to thereby increase the hypotenuse angles, the height of the rectangular sections 32 and 34 needs to be increased accordingly.

The reason the two edges 46 and 48 are formed, and not just a single edge extending along the invisible hypotenuse line to form a triangular shape, is so that an overlapping surface is provided when the structure is eventually bent. This facilitates fastening the downpipe or downpipe connector at the appropriate angle because it provides an overlapping surface through which a fastening means such as a rivet or the like may extend. This overlapping fastening configuration will become obvious to the reader when viewing the further drawings.

It is to be understood that the shape of each of the side cutouts 38 and 40 is not intended to be limited to that which is shown and described. In a broad form of the invention, the shape of each side cutout may be a 3-sided polygon for example a triangle rather than quadrilateral, in which case an alternate means of fastening may be required because there would be no overlapping surfaces.

Furthermore, different bend angles could be achieved not necessarily only by adjusting the angle of the invisible hypotenuse as described above. For example, the triangular shape of each side cutout need not necessarily be a right angle triangle but could be isosceles or scalene. In the embodiment shown, the angle between the two adjacent edges 42 and 44 could be more or less than 90 degrees, and this is yet a further way of producing a bend angle other than 45 degrees. My manipulating the shape of the side cutouts 38 and 40, the pipe can be made to bend at most angles, keeping in mind that there may not be a practical application for a downpipe or downpipe connector having more than say a 90 degree bend from vertical.

Whilst a roll forming machine is not shown in the drawings, Figure 4 illustrates what the downpipe or downpipe component will look like after it has undergone roll forming through such a machine. The skilled addressee would realise that during roll forming, if the tabs 20 along which the longitudinal fold lines extend were not present, roll forming along the fold lines 24 would result in deformation of the structure at that particular point along the length of the blank 26. Thus, the present invention provides a means of allowing a strip of material to be roll formed to form a downpipe cross section, notwithstanding that the strip includes one or more punched out sections to enable subsequent bending of the downpipe.

After the roll forming process, the outermost longitudinal edges 50 and 52 of the blank 26 meet along the centre of the pipe, but are still free and need to be joined. They may be joined using any suitable means, including crimping or welding. Whilst the other Figures do not show these lines for the purpose of brevity, Figure 2 illustrates longitudinal fold lines 54 extending adjacent the outermost edges which when folded assist in joining of the two edges together. These folds may be formed by the same method as the other folds, i.e. by using a roll forming machine (not shown). The resultant closed structure resulting from the edges being joined is shown in Figure 5.

The enlarged view of Figure 6 illustrates how the tabs 20 and 36 can then be cut away, in the embodiment shown using tin snips 56, to form the structure shown in Figure 7 now having an opening 58 allowing the structure to be bent. Figure 8 shows the resulting angled downpipe (or downpipe connector) after the structure of Figure 7 has been bent along a transverse axis defined by the fold lines 60 shown in the unfolded blank of Figures 2-3. The overlapping portion mentioned earlier, which is defined by edges 46 and 48 of each of the side cutouts 38 and 40, is stretched slightly so that it extends over the outside of the structure during the bending process. The overlapping portion is defined between the edges 46 and 48 and the invisible hypotenuse, and can then be riveted as indicated by rivet 62, or fastened using another suitable means. In an alternate embodiment, the overlapping portion may extend inside the downpipe rather than outside.

It is to be understood that cutting of the tabs and bending and fastening of the downpipe or downpipe connector could be done either off site during the manufacturing process, or onsite by a tradesperson during the gutter assembling process.

Figure 9 illustrates the downpipe connector 10A, constructed using the methods described with reference to Figures 3 to 9, being fitted inside a further angled downpipe connector referenced 10B. In this embodiment, the downpipe connector 10A connects only to

one component thereabove because it is the lowermost downpipe component. To facilitate sliding of one angled downpipe or downpipe connector into another, as shown in Figure 9, the longitudinal edges 50 and 52 may be constructed on a very slight angle such that one end of the downpipe that is constructed includes a cross section that is slightly less than the other. This provides an advantage when the spacing between one downpipe bend and another may not necessarily be known at the time the components are being manufactured, and it may be useful to have a means of adjusting the relative distances onsite.

For example, the obstacle 18 shown in Figure 1 may extend out from the wall a further distance than what was originally stated on building plans. If individual downpipe connectors 10A were being used in the embodiment of Figure 1, and they included slightly angled longitudinal edges as described in the paragraph above, then it wouldn't matter if the obstacle extended a greater distance outwardly because the distances between the connectors could be adjusted.

In a preferred embodiment, the method of manufacturing each downpipe or downpipe connector for a building structure is automated in that each machine including the punching and roll forming machines (not shown) is configured to receive operational instructions from a computing means (not shown) into which data can be input. Those skilled in the art would realise that once a house plan is drawn up, for example, the number of downpipes or downpipe connectors required, their location, their lengths, their end configurations, and the amount of bends required in each component and the bend angles, will all be known. Such information can be input into the computing means, which is then translated into operational instructions for each of the machines, and a strip of metal can be fed through and undergo the required processes to form each and every downpipe or downpipe connector. Such processes include punching sections out of the strip wherever a bend is required (the section shape depending on the required angle), roll forming of the strip to create the gutter cross section, and cutting the leading and trailing edge of each component, whether that be straight or on an angle.

Further advantages and improvements may very well be made to the present invention without deviating from its scope. Although the invention has been shown and described in what is conceived to be the most practical and preferred embodiment, it is recognized that departures may be made therefrom within the scope and spirit of the invention, which is not to be limited to the details disclosed herein but is to be accorded the full scope of the claims so as to embrace any and all equivalent devices and apparatus.

In any claims that follow and in the summary of the invention, except where the context requires otherwise due to express language or necessary implication, the word “comprising” is used in the sense of “including”, i.e. the features specified may be associated with further features in various embodiments of the invention.

CLAIMS:

1. A downpipe for a gutter system, or a downpipe connector for a gutter system adapted to join a first and second downpipe at different angles, including a first downpipe portion extending at a first angle and a second downpipe portion extending at a second angle, said first and second downpipe portions being of a single piece, roll formed construction.
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2. A downpipe blank comprising:
a longitudinal strip of material including two outer edges and longitudinally extending fold lines, said strip adapted to be folded along said fold lines to thereby form said downpipe cross section;
a punched out section disposed inside of said two outer edges, said punched out section enabling said downpipe to be bent to a predetermined angle after it has been folded along said fold lines; and
wherein said punched out section is such that material is not punched out along said longitudinal fold lines.
0
3. A downpipe blank according to claim 2 wherein said downpipe is rectangular in cross section, said blank including two innermost fold lines and two outer fold lines, a first area between the innermost fold lines defining a front downpipe surface, a second area between the inner and outer fold lines forming two side downpipe surfaces, and a third area between the outer fold lines and the two outer edges defining a rear downpipe surface when the outer edges are joined; and
wherein material is punched out of both the first and second areas of the blank such that said punched out section in the first area includes a longitudinal tab of material that is not punched out to provide reinforcement to the first area of the blank proximate said punched out section, and said punched out section in each second area is shaped in the form of at least a 3-sided polygon having a base edge extending adjacent and parallel to the corresponding innermost fold line and an adjacent edge extending to the corresponding outer fold line, the angle between the base and adjacent edge dictating the extent to which the downpipe can be bent once folded.
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4. A method of manufacturing a gutter downpipe including the steps of:
30 (a) cutting out one or more transverse sections from a longitudinal strip of material to enable said strip of material to be bent to a predetermined angle, ensuring that material is not cut out along longitudinal fold lines;
(b) folding said strip of material along the longitudinal fold lines and joining side edges thereof to form the gutter downpipe structure;

- (c) cutting away the material which was not cut away in step (a) along the longitudinal fold lines;
- (d) bending said downpipe structure about a transverse axis at said cut out section to said predetermined angle; and
- (e) securing said downpipe structure at said predetermined angle using a fastening means.

5. A downpipe or downpipe connector manufactured from a downpipe blank as defined in any one of claims 1-4.

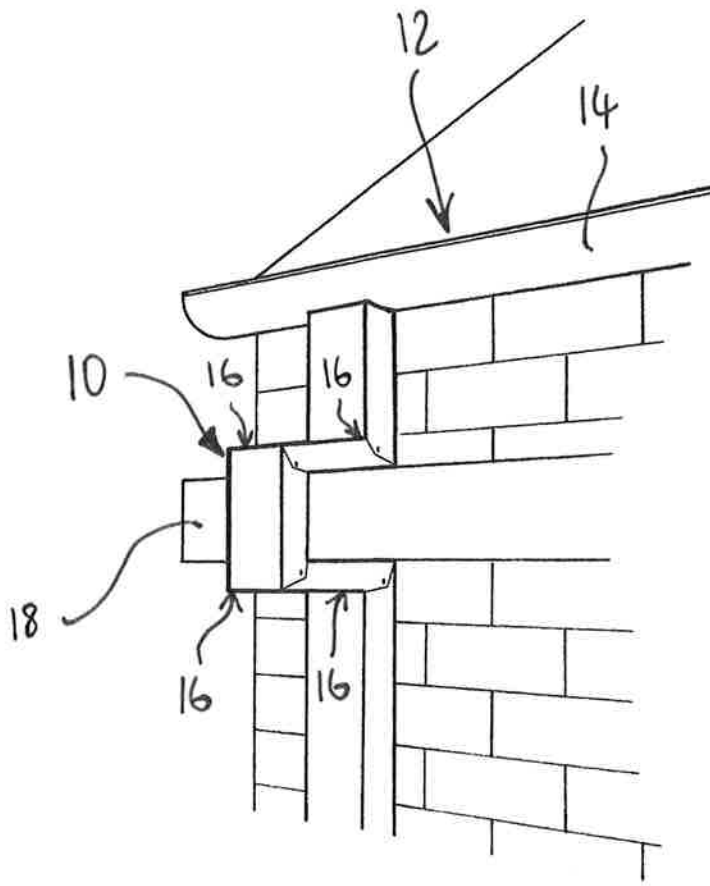


Fig 1

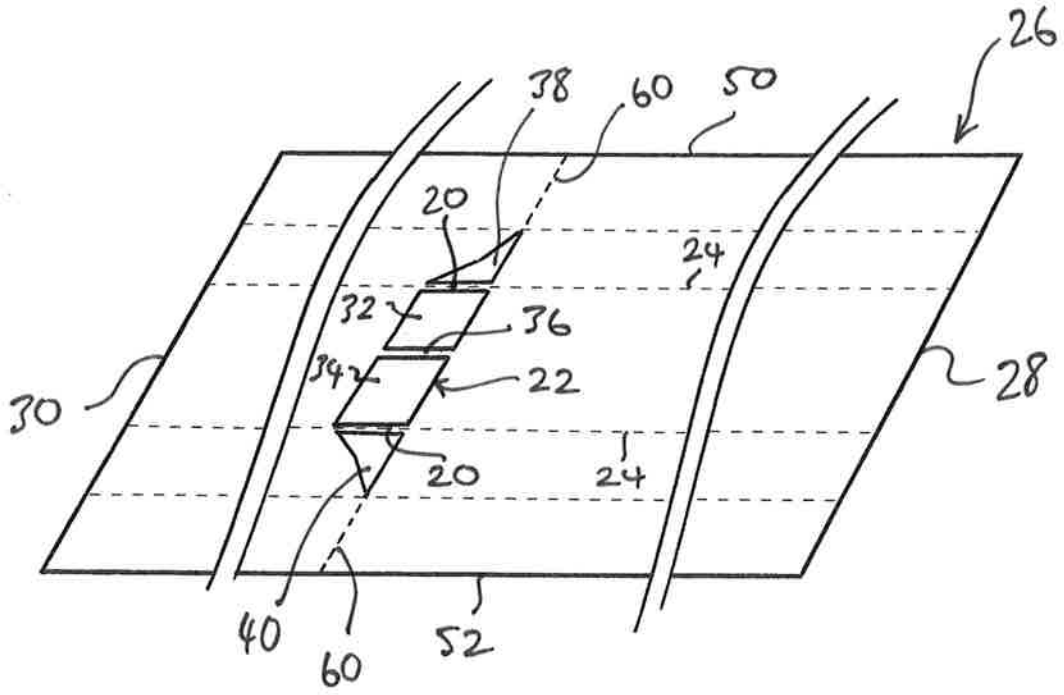


Fig 3

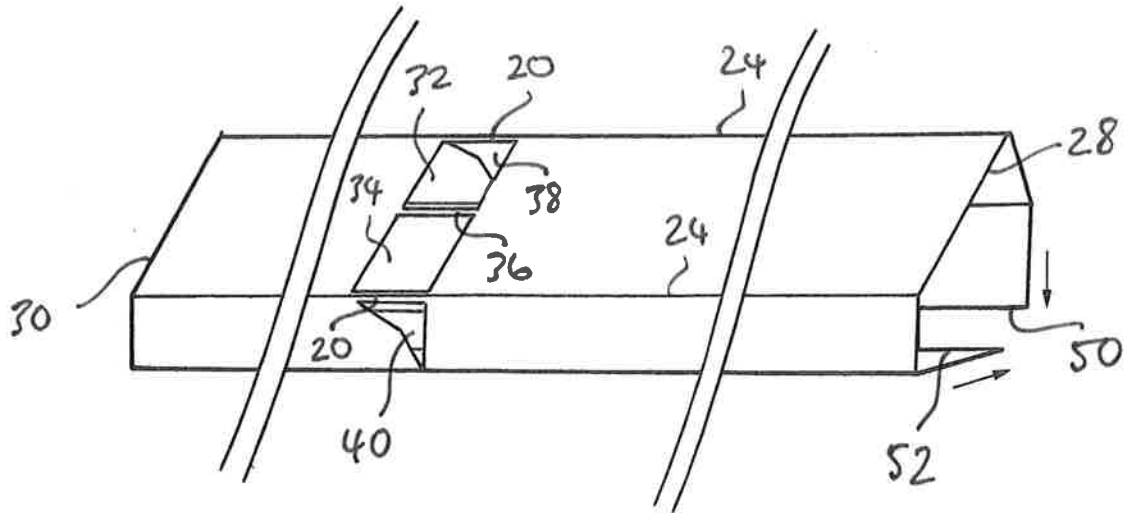


Fig 4

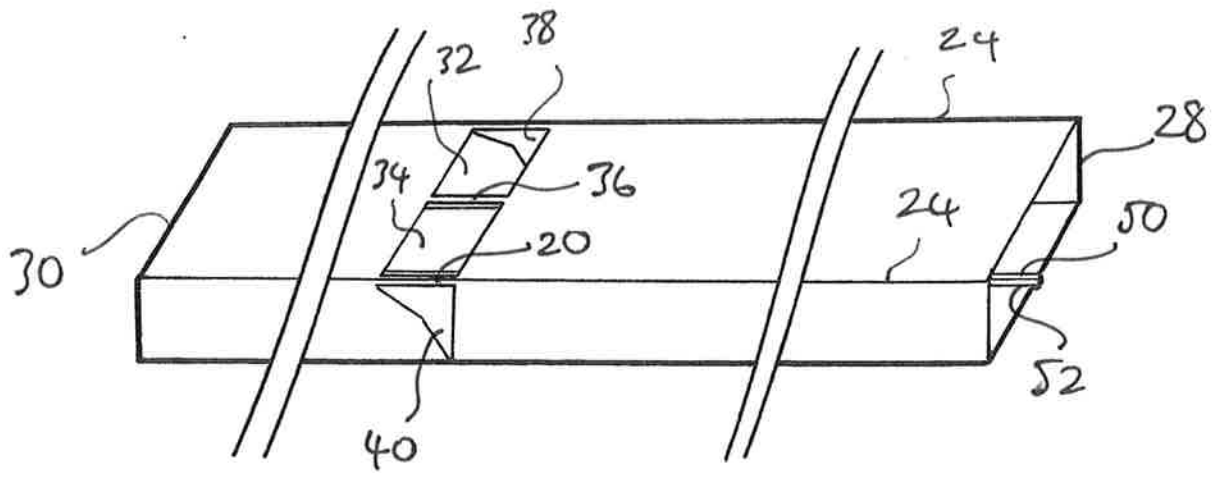


Fig 5

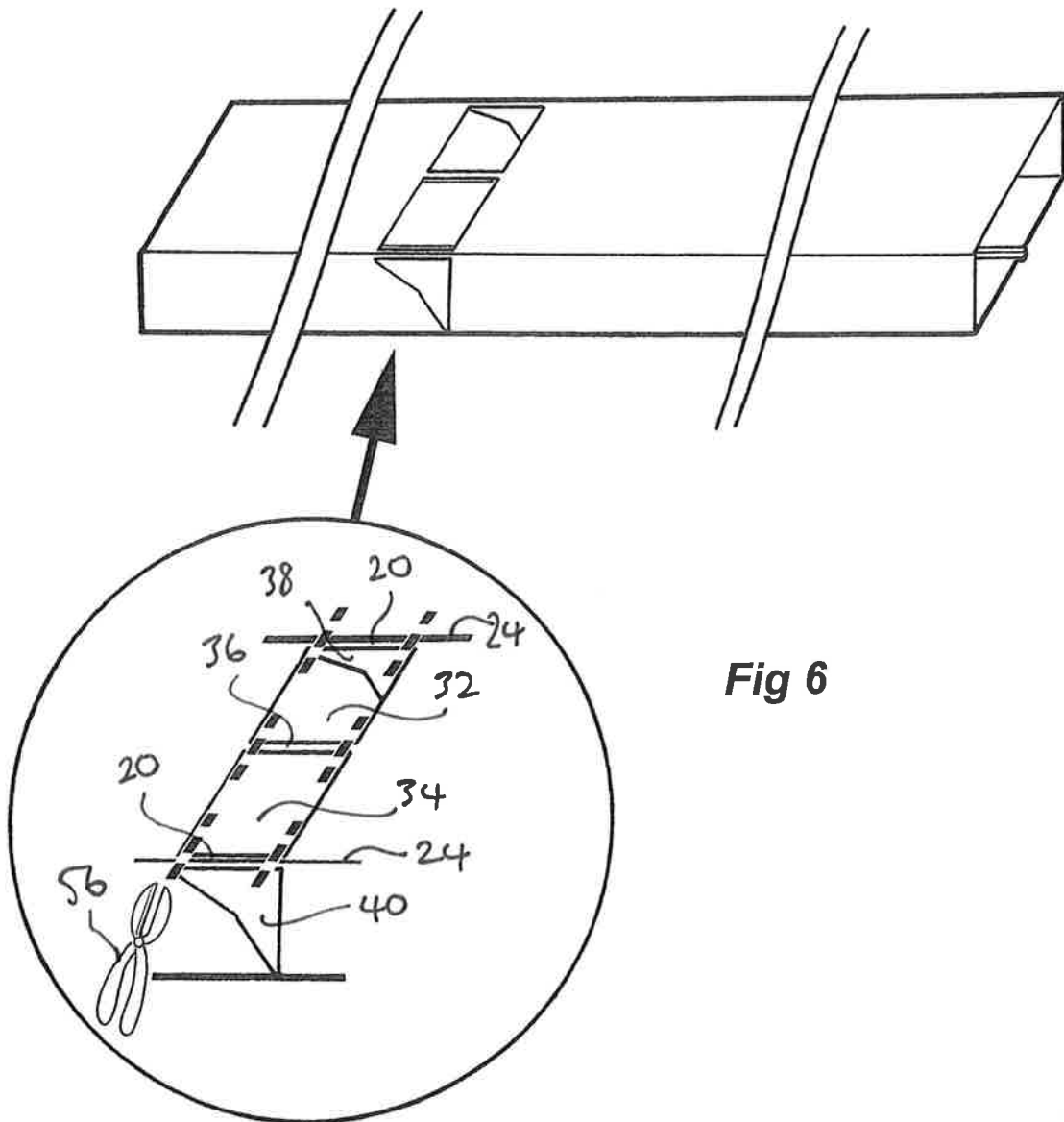


Fig 6

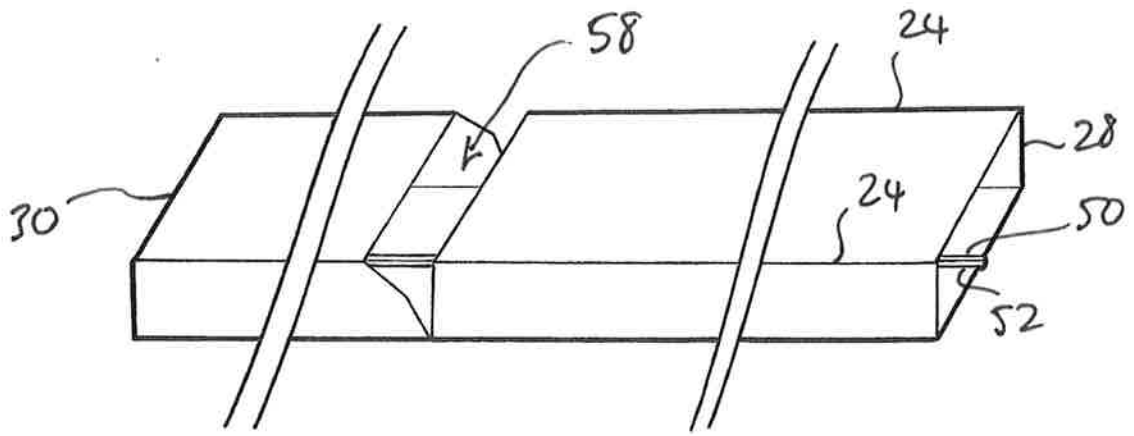


Fig 7

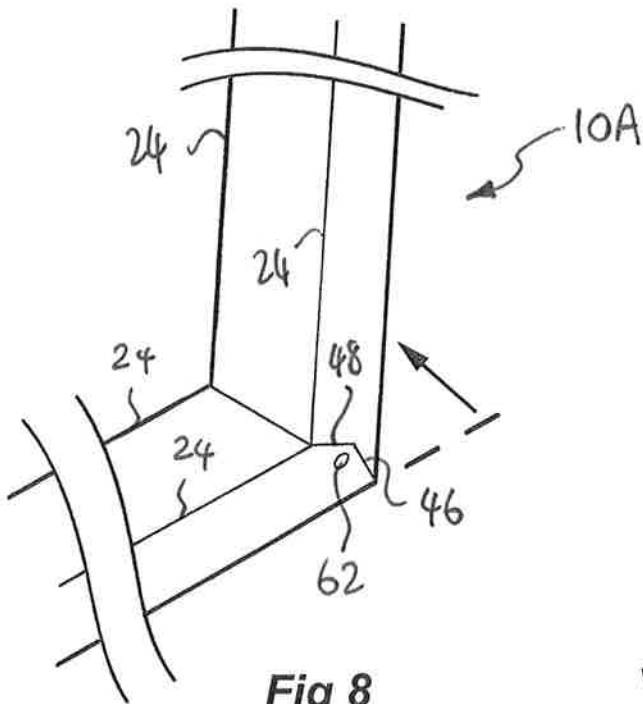


Fig 8

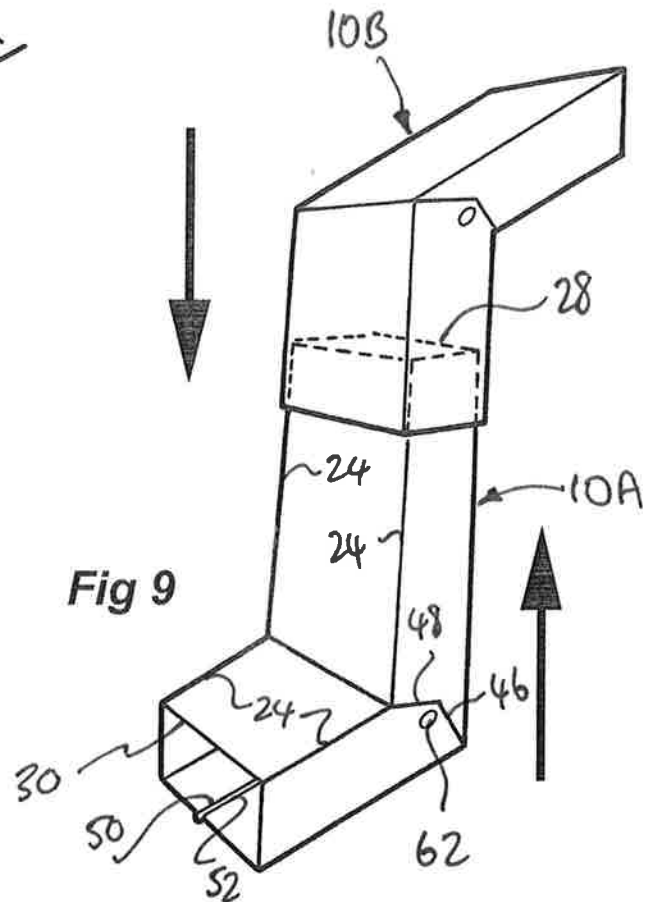


Fig 9