

PATENT SPECIFICATION

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(72) Inventors ROBERT CYRIL LYON and PETER DELHEES



(54) SUPPORTS FOR CABLES, PIPES AND THE LIKE

(71) We, BICC LIMITED, a British Company, of 21 Bloomsbury Street, London WC1B 3QN, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to supports for cables, pipes and other elongate members; for the sake of simplicity only cables will be referred to hereinafter, it being understood that other elongate members may be substituted therefor.

More particularly the invention relates to elongate supports of the kind to which cables are attached at appropriate intervals along their length and are themselves supported at intervals which are normally much larger than the intervals between cable attachments.

It relates primarily, though not exclusively, to heavy-duty supports capable of supporting heavy loads and/or bridging very long spans.

Presently available supports of this kind are of two classes, ladders and trays.

Ladders, as their name implies, have separate side members (stiles) and cross-members (rungs). They are normally used with the rungs in a horizontal position with the cables laid on top, but a few designs can be used with the rungs vertical and the cables fixed to one or rarely both sides.

Trays are made of sheet metal, usually perforated to facilitate fixings. Flanges are provided on the longitudinal edges of the tray and are usually integral with the sheet-metal web of the tray, though in a few designs separately-rolled flanges have been used. Trays are also designed primarily for use in a horizontal position, and the flanges are arranged to project in the normally upward direction so as to offer some protection to the cables laid on the web. Trays are sometimes used in a vertical position, that is with the longitudinal edges one above the other, but except for light-duty work it is difficult to support them in this position, especially if it is desired to fix cables on both sides of the tray.

The support in accordance with the present invention is primarily intended for use in a vertical position, and comprises a perforated sheet-metal web having on each of its longitudinal edges a compound flange which projects, preferably symmetrically, on both sides of the web and provides a channel which opens at the face of the flange that is remote from the web in a slot that is narrower than the underlying part of the channel.

The compound flanges are preferably formed separately from the web and welded to it, preferably by a continuous seam, but an integral construction could be adopted. In each case either rolling or extrusion could be used. The slot may be defined by simple flanges projecting inwardly from the sidewalls of the channel, by angled flanges extending first inwardly towards one another and then downwardly towards the base of the channel, or by curved flanges extending first upwardly and inwardly and then inwardly and downwardly. Channelling of all these sections is commercially available.

The perforations in the web may be spaced evenly over its area, but preferably, to maximise rigidity, they are confined to spaced groups at intervals corresponding to the attachment interval of the cables to be supported, e.g. every half metre or so. Round perforations can be used, but preferably at least some of the perforations are slots, extending perpendicular to the longitudinal edges of the web, so that the cables may be supported by fittings of the kind described and claimed in the Complete Specification of our co-pending British Patent Application No. 27595/76 (Serial No. 1,577,726).

When the support is mounted in the preferred vertical position, its weight is preferably supported exclusively from the upper compound flange, so that both faces are kept clear for the attachment of cables and the lower edge is kept clear for access, in accordance with our Application No. 31761/76 (Serial No. 1,580,213) wherein the advantages of this arrangement are explained. After installation of the cables the lower compound

flange can be used to secure the support against lateral swinging.

Attachment can be made to the compound flanges by rectangular nuts, or other members, inserted through the slots and rotated to engage in the channel behind the flanges defining the slot, as in many applications of the channelling described. A further stiffening member may be bolted to one or each channel to increase lateral rigidity if required.

A development of the installation provides a support for cables pipes and other elongate members, comprising a perforated sheet-metal web having on each of its longitudinal edges a compound flange which projects on both sides of the web and provides a channel which opens at the face of the compound flange that is remote from the web in a slot that is narrower than the underlying part of the channel, each compound flange including an outwardly extending horizontal sub-flange on each side thereof so that the horizontal sub-flanges and the web define an open-sided duct on each side of the web, which may be completed by a two-part detachable sidewall of resilient plastics material.

The invention is further illustrated by a description, by way of example, with reference to the accompanying drawings, in which:—

Figure 1 shows a support in accordance with the invention;

Figure 2 shows an installation using the supports;

Figure 3 is an enlarged detail of a part of that installation;

Figure 4 shows another installation using the support;

Figure 5 shows a stiffening member bolted to the upper compound flange;

Figure 6 shows an alternative form of support in accordance with the invention; and

Figures 7 to 15 show accessories for use in installations incorporating the support.

The support 1 shown in figure 1 has a sheet metal web 2 made with perforations 3 and compound flanges 4 along the edges of the web. Each compound flange includes a channel section with a slot 5 defined by angled sub-flanges 6 extending at first upwards and inwards and then inwards and downwards.

The cable installation shown in figure 2 comprises several of the supports 1 shown in figure 1 arranged with their webs vertical and attached to cantilever arms 7 which are mounted on any suitable supports 8. Figure 3 shows an enlarged detail of part of this installation. The perforation 3 in the web 2 receive brackets or straps 9 for fixing cables and/or pipes 10 to both sides of the web. The upper surfaces of the cantilever arms 7 are useful for temporarily supporting cables during the positioning thereof.

Figure 4 shows an installation in which one of the supports 1 is attached to structural

steelwork 11 using a clamp 12 of the kind sold under the trade mark "Lindaptor".

Figure 5 shows an auxiliary stiffening member in the form of a plate 13 bolted to the upper compound flange 4. This increases the moment of inertia about neutral axis XX which may be required depending upon load factor and distance between supports.

Figure 6 illustrates another form of support in which the inwardly extending sub-flanges 14 of the compound flanges 15 at the top and bottom of the support web 2 are doubled back to form sub-flanges extending outwards to provide the roof 16 and floor 11 of ducting which if desired may be completed by fitting a detachable sidewall 18 made of resilient plastics material in two parts 19 and 20 which push-fit onto the roof at edge 21 and the floor at edge 22 and push-fit together at edges 23 and 24. Apertures 25 may be formed in one or more of the roof or floor members of the duct to provide ventilation holes and/or as an auxiliary cable fixing means.

Figures 7, 8 and 9 show clamps for joining four, three and two supports respectively meeting at appropriate angles. The clamps fit over the upper compound flange of each support and bolt shanks pass through the holes 26 and the slot in the compound flange and cooperate with rectangular nuts which engage behind the flanges defining the slots in the usual way.

Figure 10 shows a bracket 27 which may be bolted to the reinforcing member to fix an auxiliary cable tray to the support if required.

Figure 11 shows a universal hinge-link 28 which fits between walls 29 on a hinge-link clamp 30. Bolts pass through holes 31 in the hinge-link and the clamp and engage nuts installed in the compound flange as usual. By positioning another hinge-link in the same way on another support, the two supports can be linked by passing a pin through the holes 32 of the two hinge-links. This permits the supports to be arranged in any required angular relation about a vertical axis YY; by turning the hinge-links through 90° in their respective brackets and using the alternative holes 33, changes of gradient can be correspondingly accommodated.

Figure 12 shows a 2-flanged suspension link-clamp for hanging the support from a suspension link or chain by passing a bolt through holes 34 in the flanges 35 and through the link or chain inserted between them. Figure 13 shows a 1-flange suspension clamp 35 which can be bolted to any suitable support.

Figure 14 shows a clamp for attaching a support to a flanged girder without the need to drill the girder. A slot 37 on each part fits around a flange. A similar clamp is fitted to the opposite side of the same or another girder.

An alternative clamp to that shown in figure 9 is shown in figure 15. The extensions 38 fit inside the channel sections of the compound flanges, the sides 39 of the upward extension 40 fit between the angled flanges of the compound flange, and bolt heads engage the top surface of the angled flanges with the threaded shanks screwing into the tapped holes 41 in the clamp.

A support of the kind shown in figures 2, 3 and 4 is made by welding to each edge of a mild-steel web 305 mm wide and 1.6 mm thick a slotted channel of the kind sold by the applicant company as Leprack channel. This channel is rolled from mild steel 2.6 mm thick and has a base 41.2 mm wide bounded by limbs 20.6 mm high with semi-cylindrical interned flanges with a radius of 4.7 mm. Groups of slots are present in the web at intervals of 15.24 mm. Cables to a total weight of 100 kg/m are attached to the support using the brackets shown in the drawings of Complete Specification No. 27595/76 Serial No. 1,577,726 on both sides of the web. With this loading the support safely bridges a space of six metres between supports when required.

Wherever appropriate screws may be, and preferably are, pre-inserted in the fittings in the manner described in the Provisional Specification of our copending application No. 4467/77 (Serial No. 1,579,941).

WHAT WE CLAIM IS:—

1. A support comprising a perforated sheet-metal web having on each of its longitudinal edges a compound flange which projects on both sides of the web and provides a channel which opens at the face of the flange that is remote from the web in a slot that is narrower than the underlying part of the channel.

2. A support as claimed in Claim 1 wherein each compound flange projects symmetrically on both sides of the web.

3. A support as claimed in any one of the preceding Claims wherein the compound flanges are formed separately from the web.

4. A support as claimed in Claim 3 wherein the compound flanges are welded to the web by a continuous seam.

5. A support as claimed in any one of Claims 1 and 2 wherein the compound flanges are formed as an integral construction with the web.

6. A support as claimed in any one of the preceding Claims wherein the perforations in the web are spaced evenly over its area.

7. A support as claimed in any one of Claims 1 to 5 wherein the perforations in the web are confined to spaced groups at intervals corresponding to the attachment interval of the cables to be supported.

8. A support as claimed in any one of the preceding Claims wherein it is mounted in the vertical position with its weight supported

from the upper compound flange.

9. A support comprising a perforated sheet-metal web having on each of its longitudinal edges a compound flange which projects on both sides of the web and provides a channel which opens at the face of the compound flange that is remote from the web in a slot that is narrower than the underlying part of the channel, each compound flange including an outwardly extending horizontal sub-flange on each side thereof so that the horizontal sub-flanges and the web define an open-sided duct on each side of the web.

10. A support comprising a perforated sheet-metal web having on each of its longitudinal edges a compound flange which projects on both sides of the web and provides a channel which opens at the face of the compound flange that is remote from the web in a slot that is narrower than the underlying part of the channel, each compound flange including an outwardly extending horizontal sub-flange on each side thereof so that the horizontal sub-flanges, the web, and a two-part detachable sidewall of resilient plastics material define an enclosed duct on each side of the web.

11. A support as claimed in any one of Claims 9 and 10 wherein each compound flange projects symmetrically on both sides of the web.

12. A support as claimed in any one of Claims 9 to 11 wherein the compound flanges are formed separately from the web.

13. A support as claimed in Claim 12 wherein the compound flanges are welded to the web by a continuous seam.

14. A support as claimed in any one of Claims 9 to 13 wherein the perforations in the web are spaced evenly over its area.

15. A support as claimed in any one of Claims 9 to 13 wherein the perforations in the web are confined to spaced groups at intervals corresponding to the attachment interval of the cables to be supported.

16. A support as claimed in any one of Claims 9 to 15 wherein it is mounted in the vertical position with its weight supported from the upper compound flange.

17. A support as claimed in any one of the preceding Claims wherein the perforations are round.

18. A support as claimed in any one of the preceding Claims wherein at least some of the perforations are slots extending perpendicular to the longitudinal edges of the web.

19. A support as claimed in any one of the preceding Claims wherein a stiffening member is bolted to one or each channel.

20. A support substantially as hereinbefore described with reference to and as shown in figure 1 of the accompanying drawings.

21. A support substantially as hereinbefore described with reference to and as shown in figure 6 of the accompanying drawings.

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An alternative clamp to that shown in figure 9 is shown in figure 15. The extensions 38 fit inside the channel sections of the compound flanges, the sides 39 of the upward extension 40 fit between the angled flanges of the compound flange, and bolt heads engage the top surface of the angled flanges with the threaded shanks screwing into the tapped holes 41 in the clamp.

A support of the kind shown in figures 2, 3 and 4 is made by welding to each edge of a mild-steel web 305 mm wide and 1.6 mm thick a slotted channel of the kind sold by the applicant company as Leprack channel. This channel is rolled from mild steel 2.6 mm thick and has a base 41.2 mm wide bounded by limbs 20.6 mm high with semi-cylindrical interned flanges with a radius of 4.7 mm. Groups of slots are present in the web at intervals of 15.24 mm. Cables to a total weight of 100 kg/m are attached to the support using the brackets shown in the drawings of Complete Specification No. 27595/76 Serial No. 1,577,726 on both sides of the web. With this loading the support safely bridges a space of six metres between supports when required.

Wherever appropriate screws may be, and preferably are, pre-inserted in the fittings in the manner described in the Provisional Specification of our copending application No. 4467/77 (Serial No. 1,579,941).

WHAT WE CLAIM IS:—

1. A support comprising a perforated sheet-metal web having on each of its longitudinal edges a compound flange which projects on both sides of the web and provides a channel which opens at the face of the flange that is remote from the web in a slot that is narrower than the underlying part of the channel.

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3. A support as claimed in any one of the preceding Claims wherein the compound flanges are formed separately from the web.

4. A support as claimed in Claim 3 wherein the compound flanges are welded to the web by a continuous seam.

5. A support as claimed in any one of Claims 1 and 2 wherein the compound flanges are formed as an integral construction with the web.

6. A support as claimed in any one of the preceding Claims wherein the perforations in the web are spaced evenly over its area.

7. A support as claimed in any one of Claims 1 to 5 wherein the perforations in the web are confined to spaced groups at intervals corresponding to the attachment interval of the cables to be supported.

8. A support as claimed in any one of the preceding Claims wherein it is mounted in the vertical position with its weight supported

from the upper compound flange.

9. A support comprising a perforated sheet-metal web having on each of its longitudinal edges a compound flange which projects on both sides of the web and provides a channel which opens at the face of the compound flange that is remote from the web in a slot that is narrower than the underlying part of the channel, each compound flange including an outwardly extending horizontal sub-flange on each side thereof so that the horizontal sub-flanges and the web define an open-sided duct on each side of the web.

10. A support comprising a perforated sheet-metal web having on each of its longitudinal edges a compound flange which projects on both sides of the web and provides a channel which opens at the face of the compound flange that is remote from the web in a slot that is narrower than the underlying part of the channel, each compound flange including an outwardly extending horizontal sub-flange on each side thereof so that the horizontal sub-flanges, the web, and a two-part detachable sidewall of resilient plastics material define an enclosed duct on each side of the web.

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20. A support substantially as hereinbefore described with reference to and as shown in figure 1 of the accompanying drawings.

21. A support substantially as hereinbefore described with reference to and as shown in figure 6 of the accompanying drawings.

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F. TARBOX,
Agents for the Applicants,
38 Wood Lane,
London W12 7DX.

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