

SPECIFICATION

Securing device

This invention relates to a device for securing at least one cable, pipe or other elongate member to a support and/or for securing together two or more cables, pipes or other elongate members, for convenience, hereinafter being included in the term "cable".

In installing single-core electric power cables in cable networks of industrial plant, it is the general practice to arrange three single-core power cables alongside one another with their axes passing through the apices of a triangle, such an arrangement usually being referred to as trefoil cable group. A trefoil cable group is usually secured to a cable ladder by means of cleats and, at spaced positions between the cleats, the cables of the group are secured together by cable straps or ties. Present arrangements have the disadvantage that for different sizes of cables different sizes of cable straps and cleats have to be used.

It is an object of the present invention to provide a device for securing at least one cable to a support and/or for securing together two or more cables which is capable of accommodating a greater range of cable sizes.

According to the present invention the device comprises a base member having two inclined surfaces on which the or two of the cables can rest; a bar which is spaced from the base member between the inclined surfaces and extends lengthwise of the cable or cables and which is secured to the base member; a strap which can be passed around the bar and the cable or cables at least once; and tensioning means which can tension the strap when positioned around the bar and the cable or cables, to secure the cable or cables together and/or to secure the cable or cables to the base member.

Preferably the base member having two inclined surfaces and the bar around which the strap passes are integral.

The inclined surfaces may be defined by an arcuate surface or two arcuate surfaces, but preferably they are two planar surfaces. Preferably the surfaces of the bar are also inclined.

When the device is in use for securing two or more cables it is preferable that the strap is passed around the bar and the cables at least twice in order to prevent the strap cutting into one or more of the cables due to any outward lateral movement of one of the cables (for example, as occurs when an electrical cable is subjected to a high level short circuit current).

The strap is preferably made of stainless steel. The base member is preferably made of cast metal or metal alloy, and is preferably capable of being secured to a cable ladder or other supporting surface.

The tensioning means preferably comprises a plate having upstanding walls at each end between which the strap can pass; a rod having a longitudinally extending slit, the rod being

rotatably securable in aligned apertures in the upstanding walls of the plate; and locking means for preventing rotation of the rod when positioned in the apertures. This arrangement is such that in use one end of the strap of the securing device is fastened to the plate (for example by welding), and, after the strap has passed one or more times around the bar of the securing device and the cable or cables to be secured and the rod has been positioned in the apertures in the upstanding walls of the plate, the free end of the strap is passed through the slit in the rotatable rod, the rod is rotated to tension the strap around the bar and the cable or cables, and the locking means is then used to prevent further rotation (either tightening or loosening the strap) of the rod.

The plate is preferably made of stainless steel.

The rod is preferably a stainless steel split pin. In this case the locking means preferably comprises a key which engages in the eye of the split pin and can be used to assist in rotating the split pin, and the upstanding walls of the plate preferably have aligned slots such that after rotation of the split pin the key can be turned over to engage in the aligned slots to prevent further rotation of the split pin.

This device can be used for securing a cable or cables to a supporting surface and/or for securing together any number of cables, and is capable of accommodating a greater range of cable sizes than the known cleats, with four sizes of this device replacing at least thirty-three sizes of known cleats.

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

Figures 1 and 2 are end and side views respectively of a device in accordance with the invention;

Figures 3 and 4 are end and side views respectively of a second device in accordance with the invention;

Figure 5 is a cross-section view on the line V—V in Figure 6 of a third device in accordance with the invention;

Figure 6 is a top view of the base member with the integral bar of the device shown in Figure 5, with the adaptor, strap, tensioning means and cables omitted for clarity;

Figure 7 is a side view of the base member and integral bar shown in Figure 6;

Figures 8 and 9 are side and top views respectively of the adaptor shown in Figure 5;

Figure 10 is a perspective view of the securing device shown in Figures 1 and 2 with the tensioning means shown in more detail;

Figures 11 and 12 are top and side views respectively of the strap and plate shown in Figure 10;

Figure 13 is a view of the key and split pin used with the plate and strap shown in Figures 11 and 12; and

Figure 14 is a developed view of the plate shown in Figures 11 and 12.

Referring to Figures 1 and 2, the device 1 for

securing three cables 2 together and for securing them to a support (not shown) comprises a base member having two inclined surfaces 4, 5 on which two of the cables rest, a bar 6 provided by the central limb of a substantially U-shaped member 7 which is secured to the base member 3 by split pins 8, such that the bar 6 is spaced from the base member 3 between the inclined surfaces 4, 5 and extends lengthwise of the cables 2. The cables 2 are secured by a stainless steel strap 9 which passes around the cables and the bar 6 and which is tensioned by a rotatable split pin arrangement 10 (described in more detail later). The base member 3 is secured to a support (e.g. a cable ladder) by bolts 11.

A similar arrangement as shown in Figures 3 and 4 in which the device 12 comprises a base member 13, a bar 14 is provided by the central limb of a U-bolt 15 secured to the base member 13, a stainless steel strap 16 and tensioning means (which is omitted for clarity). Further tensioning may be provided by adjusting the nuts 17 on the U-bolt 15.

A third arrangement is shown in Figures 5 to 9 inclusive. In this arrangement the device 18 comprises a base member 19 which is integral with a bar 20, both of which have inclined surfaces 21, 22, a stainless steel strap 23, 23 and tensioning means (which is omitted for clarity). An adaptor 24 is also shown which allows the base member 19 to be secured to a support (not shown) by a single bolt 25, access to which can be made through aperture 26 in the base member 19 before the cables are secured in position. Without this adaptor 24, the base member 19 can still be secured in the usual way through bolt holes 27. A hooked portion 28 on the adaptor 24 engages in one of the bolt holes 27 to prevent the device 18 sliding if mounted vertically.

The range taking capability of these devices is emphasised in Figure 5, which shows how three cables 29 of one size can be secured, and the alternative of securing three cables 29' of a larger size using the same device.

One form of tensioning means is not described with reference to Figures 10 to 14 inclusive. The tensioning means 10 comprises a stainless steel plate 30 having upstanding walls 31 at each end between which the strap 9 passes. A rod, in the form of a stainless steel split pin 32 is rotatably secured in aligned apertures 33 in the upstanding walls 31 of the plate 30. In this arrangement one end 34 of the strap 9 is welded to the central portion 35 of the plate 30. The free end 36 of the strap 9 is passed around the cables 2 to be secured and the bar (not visible in Figure 10) of device 1, and then passed through the split in the split pin 32. Rotating the split pin 32 winds the

strap 9 around the split pin and thereby tensions the strap around the cables 2. Locking means is provided by a key 37 which engages in the eye 38 of the split pin 32 and can be used to assist in rotating the split pin, and which can lock the split pin by being turned over to engage in aligned slots 39 in the upstanding walls 31 of the plate 30.

This tensioning means can also be used in the arrangements shown in Figures 3 and 4 and Figures 5 to 9.

CLAIMS

1. A device for securing at least one cable to a support and/or for securing together two or more cables comprising a base member having two inclined surfaces on which the or two of the cables can rest; a bar which is spaced from the base member between the inclined surfaces and extends lengthwise of the cable or cables and which is secured to the base member; a strap which can pass around the bar and the cable or cables at least once; and tensioning means which can tension the strap when positioned around the bar and the cable or cables, to secure the cable or cables together and/or to secure the cable or cables to the base member.

2. A device as claimed in Claim 1, in which the base member having two inclined surfaces and the bar around which the strap passes are integral.

3. A device as claimed in Claim 1 or Claim 2, in which the inclined surfaces are planar surfaces.

4. A device as claimed in any one of the preceding claims, in which the tensioning means comprises a plate having upstanding walls at each end between which the strap can pass; a rod having a longitudinally extending slit, the rod being rotatably securable in aligned apertures in the upstanding walls of the plate; and locking means for preventing rotation of the rod when positioned in the apertures.

5. A device as claimed in Claim 4, in which the rod is a split pin, the locking means comprises a key which engages in the eye of the split pin and which can be used to assist in rotating the split pin, and the upstanding walls of the plate have aligned slots, the arrangement being such that after rotation of the split pin the key can be turned over to engage in the aligned slots to prevent further rotation of the split pin.

6. A device as hereinbefore described, with reference to, and as shown in, Figures 1, 2 and 10 to 14 of the accompanying drawings.

7. A device as hereinbefore described, with reference to, and as shown in, Figures 3, 4 and 10 to 14 of the accompanying drawings.

8. A device as hereinbefore described, with reference to, and as shown in, Figures 5 to 14 of the accompanying drawings.



securing three cables 2 together and for securing them to a support (not shown) comprises a base member having two inclined surfaces 4, 5 on which two of the cables rest, a bar 6 provided by the central limb of a substantially U-shaped member 7 which is secured to the base member 3 by split pins 8, such that the bar 6 is spaced from the base member 3 between the inclined surfaces 4, 5 and extends lengthwise of the cables 2. The cables 2 are secured by a stainless steel strap 9 which passes around the cables and the bar 6 and which is tensioned by a rotatable split pin arrangement 10 (described in more detail later). The base member 3 is secured to a support (e.g. a cable ladder) by bolts 11.

A similar arrangement as shown in Figures 3 and 4 in which the device 12 comprises a base member 13, a bar 14 is provided by the central limb of a U-bolt 15 secured to the base member 13, a stainless steel strap 16 and tensioning means (which is omitted for clarity). Further tensioning may be provided by adjusting the nuts 17 on the U-bolt 15.

A third arrangement is shown in Figures 5 to 9 inclusive. In this arrangement the device 18 comprises a base member 19 which is integral with a bar 20, both of which have inclined surfaces 21, 22, a stainless steel strap 23, 23 and tensioning means (which is omitted for clarity). An adaptor 24 is also shown which allows the base member 19 to be secured to a support (not shown) by a single bolt 25, access to which can be made through aperture 26 in the base member 19 before the cables are secured in position. Without this adaptor 24, the base member 19 can still be secured in the usual way through bolt holes 27. A hooked portion 28 on the adaptor 24 engages in one of the bolt holes 27 to prevent the device 18 sliding if mounted vertically.

The range taking capability of these devices is emphasised in Figure 5, which shows how three cables 29 of one size can be secured, and the alternative of securing three cables 29' of a larger size using the same device.

One form of tensioning means is not described with reference to Figures 10 to 14 inclusive. The tensioning means 10 comprises a stainless steel plate 30 having upstanding walls 31 at each end between which the strap 9 passes. A rod, in the form of a stainless steel split pin 32 is rotatably secured in aligned apertures 33 in the upstanding walls 31 of the plate 30. In this arrangement one end 34 of the strap 9 is welded to the central portion 35 of the plate 30. The free end 36 of the strap 9 is passed around the cables 2 to be secured and the bar (not visible in Figure 10) of device 1, and then passed through the split in the split pin 32. Rotating the split pin 32 winds the

strap 9 around the split pin and thereby tensions the strap around the cables 2. Locking means is provided by a key 37 which engages in the eye 38 of the split pin 32 and can be used to assist in rotating the split pin, and which can lock the split pin by being turned over to engage in aligned slots 39 in the upstanding walls 31 of the plate 30.

This tensioning means can also be used in the arrangements shown in Figures 3 and 4 and Figures 5 to 9.

CLAIMS

1. A device for securing at least one cable to a support and/or for securing together two or more cables comprising a base member having two inclined surfaces on which the or two of the cables can rest; a bar which is spaced from the base member between the inclined surfaces and extends lengthwise of the cable or cables and which is secured to the base member; a strap which can pass around the bar and the cable or cables at least once; and tensioning means which can tension the strap when positioned around the bar and the cable or cables, to secure the cable or cables together and/or to secure the cable or cables to the base member.

2. A device as claimed in Claim 1, in which the base member having two inclined surfaces and the bar around which the strap passes are integral.

3. A device as claimed in Claim 1 or Claim 2, in which the inclined surfaces are planar surfaces.

4. A device as claimed in any one of the preceding claims, in which the tensioning means comprises a plate having upstanding walls at each end between which the strap can pass; a rod having a longitudinally extending slit, the rod being rotatably securable in aligned apertures in the upstanding walls of the plate; and locking means for preventing rotation of the rod when positioned in the apertures.

5. A device as claimed in Claim 4, in which the rod is a split pin, the locking means comprises a key which engages in the eye of the split pin and which can be used to assist in rotating the split pin, and the upstanding walls of the plate have aligned slots, the arrangement being such that after rotation of the split pin the key can be turned over to engage in the aligned slots to prevent further rotation of the split pin.

6. A device as hereinbefore described, with reference to, and as shown in, Figures 1, 2 and 10 to 14 of the accompanying drawings.

7. A device as hereinbefore described, with reference to, and as shown in, Figures 3, 4 and 10 to 14 of the accompanying drawings.

8. A device as hereinbefore described, with reference to, and as shown in, Figures 5 to 14 of the accompanying drawings.