CONNECTOR BLOCK

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ABSTRACT
Embodiments of the present invention disclose a connector block that has at least two channels wherein for connecting one signal transmission line with multiple signal transmission lines in a blasting system for transferring blasting signals, wherein one of the channels is the input end of signal transmission and one or more of the others are output ends, and wherein each channel is opened to a center cavity, thus enabling the input end and output end of transmission line to transfer the blasting signal through center cavity.
CONNECTOR BLOCK


FIELD OF THE INVENTION

[0002] The invention relates to a connector block.

SUMMARY OF THE INVENTION

[0003] According to a first aspect of the invention, there is provided a connector block which has at least two channels therein for connecting one signal transmission line with multiple signal transmission lines in a blasting system for transferring blasting signals.

[0004] One of the channels may be taken as the input end of signal transmission and one or more of the others, as the output end, wherein each channel is opened to a center cavity, thereby enabling the input end and output end of transmission line to transfer the blasting signal through center cavity.

[0005] The size and shape of channel may match the signal transmission line.

[0006] When the signal transmission line is inserted into a channel from one end, it will be received and retained in the channel and the blasting signals are transferred through center cavity.

[0007] The signal transmission line may be inserted into the channel from one end, so that in use, the transmission line will be retained therein and locked by leaf spring.

[0008] The shock wave of one transmission line may be safely transferred to the other transmission lines.

[0009] The leaf spring may be released by pressing on a guide sleeve in the direction of its axis so that the transmission line may be pulled out of the channel.

[0010] Each receiving and retaining channel of the body may have a locating sleeve, a sealing ring at the outside of locating sleeve, a compression sleeve at the outside of sealing ring, a leaf spring at the outside of compression sleeve, a retaining sleeve at the outside of the leaf spring, the leaf spring being located and axially compressed between compression sleeve and second stepped shoulder of retaining sleeve, the guide sleeve being retained in the bore of retaining sleeve.

[0011] The leaf spring may be a radial elastic leaf spring which consists of triangularly ridged teeth with a hole at the center, of which all ridges are bent to the same side and all ends are connected with a circumferential ring to form a closed structure.

[0012] The body may include channels which transmit from the center cavity to the ends of all channels including their transition sections, or from the small diameter sections at the center part to the large diameter sections at the ends of all channels, the retaining slot being made at the end of each channel, the outside contour of retaining sleeve having a boss thereon, the outside diameter of the retaining sleeve having the same inside diameter as the channel of the body, the inside contour of retaining sleeve being a stepped structure, the boss of the retaining sleeve matching with the retaining slot of the body.

[0013] The maximum outside diameter of compression sleeve may be a tight fit with the inside diameter of the body while the inside diameter of the compression sleeve is a clearance fit with the outside diameter of the signal transmission line.

[0014] The bore of the retaining sleeve may have two stepped shoulders therein, the outside diameter of the guide sleeve being a clearance fit with the inside diameter of the retaining sleeve, the boss of the guide sleeve entering and just falling into the first stepped shoulder in the bore of the retaining sleeve, the diameter of the boss of the guide sleeve being more than the inside diameter of the first stepped shoulder of the retaining sleeve, so that there is a clearance between the boss and the first stepped shoulder, the guide taper of the boss of the guide sleeve going forward and just falling into the cavity at the first stepped shoulder of the retaining sleeve, thus forming a buckle thereon, the center of the guide sleeve being hollow and the hollowness diameter being more than the outside diameter of the signal transmission line.

[0015] The center cavity may be formed by a spherical face of the locating sleeve at the connection of each channel and the spherical face of the body, the locating sleeve being retained in the body at the connection of each channel, the locating sleeve being hollow at the center and having a locating stepped shoulder therein near the center cavity.

[0016] The outside diameter of the sealing ring may be a tight fit with the inside diameter of the body, the inside diameter of the sealing ring having a radial elastic lip for holding the signal transmission line tightly in the ring.

[0017] The channel may consist of a guide sleeve, a leaf spring, a compression sleeve, a sealing ring, and a locating sleeve.

DESCRIPTION OF THE DRAWINGS

[0018] FIG. 1 shows a connector block which has two channels therein for connecting one signal transmission line with another signal transmission line in a blasting system for transferring blasting signals;

[0019] FIG. 2 shows a connector block which has three channels therein for connecting one signal transmission line with two signal transmission lines in a blasting system for transferring blasting signals;

[0020] FIG. 3 shows a connector block which has four channels therein for connecting one signal transmission line with three signal transmission lines in a blasting system for transferring blasting signals;

[0021] FIGS. 4 and 5 show different views of a leaf spring which form a part of the connector block of the invention.

SPECIFIC DESCRIPTION

[0022] The invention will now be described, by way of non limiting example only, with reference to the accompanying drawing.

[0023] In the drawing, a connector block has at least two channels (18) therein for connecting one signal transmission line (20) with multiple signal transmission lines (20) in a blasting system for transferring blasting signals. One of channels (18) can be taken as the input end of signal transmission and the other one (or ones), as the output end. Wherein each channel (18) is opened to center cavity (16), thus enabling the input end and output end of transmission line (20) to transfer the blasting signal through center cavity (16). The size and shape of channel (18) matches signal transmission line (20). When signal transmission line (20) is inserted into a channel
from one end, it will be received and retained in the channel and the blasting signals are transferred through center cavity (16).

[0024] Insert the signal transmission line (20) into a channel (18) from one end in the operation, and then the transmission line (20) will be retained therein and locked by leaf spring (4). The shock wave of one transmission line can be safely transferred to the other transmission lines. Press the guide sleeve (1) in the direction of axis and the leaf spring (4) will be open, then the transmission line (20) can be pulled out of the channel (18).

[0025] Each receiving and retaining channel of body (3) has locating sleeve (19), sealing ring (6) at the outside of locating sleeve (19), compression sleeve (5) at the outside of sealing ring (6), leaf spring (4) at the outside of compression sleeve (5), retaining sleeve (2) at the outside of leaf spring (4), leaf spring (4) being located and axially compressed between compression sleeve (5) and second stepped shoulder (17) of retaining sleeve (2), guide sleeve (1) being retained in the bore of retaining sleeve (2).

[0026] The radial elastic leaf spring (4) consists of triangularly ridged teeth with a hole at the center, of which all ridges are bent to the same side and all ends are connected with a circumferential ring to form a closed structure.

[0027] The channels of body (4) transit from center cavity (16) to the ends of all channels including their transition sections, or from the small diameter sections at the center part to the large diameter sections at the ends of all channels, retaining slot (7) being made at the end of each channel, the outside contour of retaining sleeve (2) having boss (8) thereon, the outside diameter of retaining sleeve (2) being the same with the inside diameter of the channel of body (3), the inside contour of retaining sleeve (2) being a stepped structure, boss (8) of retaining sleeve (2) matching with retaining slot (7) of body (3).

[0028] The maximum outside diameter of compression sleeve (5) is a tight fit with the inside diameter of body (3) while the inside diameter of compression sleeve (5) is a clearance fit with the outside diameter of signal transmission line (20).

[0029] The bore of retaining sleeve (2) have two stepped shoulders therein, the outside diameter of guide sleeve (1) is a clearance fit with the inside diameter of retaining sleeve (2), boss (10) of guide sleeve (1) enters and just falls into first stepped shoulder (9) in the bore of retaining sleeve (2), the diameter of boss (10) of guide sleeve (1) is more than the inside diameter of first stepped shoulder (9) of retaining sleeve (2), there is clearance between boss (10) and first stepped shoulder (9), guide taper (14) of boss (10) of guide sleeve (1) goes forward and just falls into the cavity at first stepped shoulder (9) of retaining sleeve (2), thus forming a buckle there, the center of guide sleeve is hollow and the hollowness diameter is more than the outside diameter of signal transmission line (20).

[0030] The center cavity (16) is formed by the spherical face (12) of locating sleeve (19) at the connection of each channel and the spherical face of body (3), locating sleeve (19) is retained in body (3) at the connection of each channel, locating sleeve (19) is hollow at the center and has locating stepped shoulder (13) therein near center cavity (16).

[0031] The outside diameter of sealing ring (6) can be a tight fit with the inside diameter of body (3), the inside diameter of sealing ring (15) has radial elastic lip for holding signal transmission line (20) tightly in the ring.

[0032] The channel consists of guide sleeve (1), leaf spring (4), compression sleeve (5), sealing ring (6) and locating sleeve (19).

1. A connector block has at least two channels therein for connecting one signal transmission line with multiple signal transmission lines in a blasting system for transferring blasting signals, wherein one of the channels is the input end of signal transmission and one or more of the others are output ends, wherein each channel is opened to a center cavity, thus enabling the input end and output end of transmission line to transfer the blasting signal through center cavity.

2. A connector block as claimed in claim 1, wherein the size and shape of channel matches the signal transmission line, wherein when signal transmission line is inserted into a channel from one end, it will be received and retained in the channel and the blasting signals are transferred through center cavity.

3. A connector block as claimed in claim 1, wherein, in use, the signal transmission line is inserted into a channel from one end in the operation, and then the transmission line will be retained therein and locked by a leaf spring, whereby the shock wave of one transmission line is safely transferred to the other transmission lines.

4. A connector block as claimed in claim 1, wherein, in use, a guide sleeve is pressed in the direction of its axis and the leaf spring will be open, then the transmission line can be pulled out of the channel.

5. A connector block as claimed in claim 1, wherein each receiving and retaining channel of the body has a locating sleeve, a sealing ring at the outside of the locating sleeve, a compression sleeve at the outside of the sealing ring, the leaf spring located at the outside of the compression sleeve, a retaining sleeve at the outside of the leaf spring which leaf spring is located and axially compressed between compression sleeve and second stepped shoulder of the retaining sleeve, with the guide sleeve being retained in the bore of the retaining sleeve.

6. A connector block as claimed in claim 1, wherein the leaf spring is a radial elastic leaf spring which consists of triangularly ridged teeth with a hole at the center, of which all ridges are bent to the same side and all ends are connected with a circumferential ring to form a closed structure.

7. A connector block as claimed in claim 1, wherein the maximum outside diameter of the compression sleeve is a tight fit with the inside diameter of the body while the inside diameter of compression sleeve is a clearance fit with the outside diameter of the signal transmission line.

8. A connector block as claimed in claim 1, wherein the bore of the retaining sleeve has two stepped shoulders therein, the outside diameter of the guide sleeve being a clearance fit with the inside diameter of the retaining sleeve, a boss of the guide sleeve enters and just falls into first stepped shoulder in the bore of the retaining sleeve, the diameter of boss of the guide sleeve being more than the inside diameter of the first stepped shoulder of the retaining sleeve, so that there is clearance between the boss and the first stepped shoulder, a guide taper of the boss of the guide sleeve going forward and just falling into the cavity at first stepped shoulder of the retaining sleeve, thus forming a buckle there, the center of the guide sleeve being hollow and the hollowness diameter being more than the outside diameter of the signal transmission line.

9. A connector block as claimed in claim 1, wherein a center cavity is formed by a spherical face of the locating sleeve at the connection of each channel and the spherical face
of the body, the locating sleeve being retained in body at the connection of each channel, the locating sleeve being hollow at the center and having the locating stepped shoulder therein near the center cavity.

10. A connector block as claimed in claim 1, wherein the outside diameter of the sealing ring is tight fitted with the inside diameter of the body, the inside diameter of the sealing ring having a radial elastic lip for holding the signal transmission line tightly in the ring.

11. A connector block as claimed in claim 1, wherein the channel consists of the guide sleeve, the leaf spring, the compression sleeve, the sealing ring, and the locating sleeve.

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