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(54) Cable harness.

(57) A cable harness comprising a plurality of conductors 10 which are laid alongside a semi-rigid support member 11 and are retained relative thereto by a sleeve 12 which surrounds the conductors and the support member.

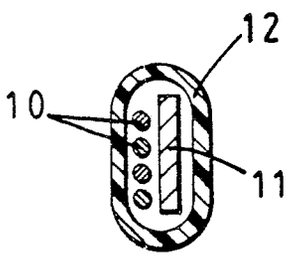

FIG 1

EP 0 305 058 A2

CABLE HARNESS

This invention relates to cable harnesses and more particularly but not exclusively, to cable harnesses for use in close proximity to moving machinery.

It is known to supply fuel to compression ignition engines by means of so-called unit injectors in which the pump and injector are combined in a single unit. The pump of the unit injector is actuated by means of an engine driven cam and the injectors are housed within the conventional rocker or cam shaft housing of the engine. The quantity of fuel supplied and the timing of fuel delivery is controlled electrically and for this purpose each unit injector incorporates a solenoid operable valve to which electrical power must be supplied. In addition, each unit injector may incorporate a transducer. It is necessary to effect electrical connections to the unit injectors and this can be achieved by using cables which are run in conduits secured within the housing. This system is impractical particularly where the conduits have to be shaped to avoid moving parts. An alternative is to provide rigid support members within the housing and to secure the cables to the support members at regular intervals. This is a time-consuming method both in terms of fixing the support members to the engine structure and securing the cables to the support members.

The object of the present invention is to provide a cable harness in a simple and convenient form.

According to the invention a cable harness comprises a plurality of conductors, an elongated semi-rigid support member and a sleeve enclosing the conductors and the support member, the sleeve acting to secure the conductors to the support member.

Examples of cable harness in accordance with the invention will now be described with reference to the accompanying drawing the figures of which are sectional side elevations of different examples.

In Figure 1 of the drawings the cables are indicated at 10 being of the insulated type and are located adjacent one side of a semi-rigid support member 11 of rectangular section. The cables and support member are held in assembled relationship by means of a sheath 12. The sheath can be woven or it may be constructed as a wrapped tape formed from plastics or it may be formed from a heat shrinkable plastics. The figure illustrates the various components of the harness in spaced relationship but in the completed harness the sheath would hold the cables and support member in close proximity.

Figure 2 shows an example in which the cables 10 are located about a support member 13 of circular section, the cables in practice being tightly held by the sheath about the support member. The sheath maybe formed as described above.

The support members 11, 13 of the examples described may be formed from metal such for example as steel or aluminium in which case the support member itself can be used to carry electric current or provide for screening of the cables. Alternatively the support member may be formed from a plastics which can be shaped to the desired form by the suitable application of heat or it may be formed from a so-called "memory" polymer which recovers to a predetermined shape on the application of heat.

The cable harness is manufactured in a flat condition and is then shaped prior to assembly to the engine or during actual assembly to the engine.

In the case where the support member is formed from a heat conducting material it can be used as a heat sink for electrical components which are accommodated in the harness such for example as resistors and diodes etc.

The harness can be secured to the engine structure at a number of discrete points as a preformed item thereby greatly reducing the cost of engine assembly.

In the specification it has been indicated that the cables are electrical cables. However, the same technique can be used for optical cables and it is of course possible to incorporate both forms of cable in the same harness.

Figure 3 shows part of a cable harness for use with a six cylinder engine and which is constructed as shown in Figure 1. The support member is shown as having a free end 14 and an intermediate portion 15 which forms a bridge between the two parts of the cable harness. The support member is formed from aluminium strip. The harness also includes a grommet 16 which is intended to be located and secured within an opening in the valve housing of the engine and passing through the grommet are twelve insulated electrical cables. Exterior of the housing the cables 17 are enclosed in a sleeve 18 formed from a heat shrinkable plastics and there may be interposed between the sleeve and the cables, a braided screen.

In the particular example a pair of conductors are connected to each pump/injector of the engine and the pairs of conductors extend at spaced intervals from along the length of the support member. The conductors of each pair or branch terminate in terminals and are enclosed by a sleeve 19 formed from heat shrinkable plastics. Further sleeves 20 also formed from heat shrinkable plastics material

enclose the support member 14 and the conductors laid thereon. The sleeves 19 extend partly within the sleeves 20 and the sleeves 20 also overlap prior to the heat shrinking operation, to ensure that the conductors are held firmly to the support member.

In the particular example the support member is approximately 1.5mm thick and 11.0mm wide and has a length appropriate to the size of the engine.

Claims

1. A cable harness comprising a plurality of conductors 10, and a sleeve (12,20) surrounding the conductors characterised by an elongated semi-rigid support member (11,13,14) which is located against the conductors and is surrounded by the sleeve.

2. A cable harness according to Claim 1 characterised in that the sleeve (12,20) is formed from a heat shrinkable plastics.

3. A cable harness according to Claim 2 characterised in that the sleeve along the length of the harness is formed as a plurality of sleeves (20) with the adjacent ends of adjacent sleeves being located one within the other, the harness having branches comprising one or more conductors extending laterally from the support member, each branch being enclosed in a further sleeve (19) which extends from within one of said first mentioned sleeves (20) at the position of overlap with the adjacent sleeve (20).

4. A cable harness according to Claim 1 characterised in that said support member (11, 13, 14) is preformed to the required shape.

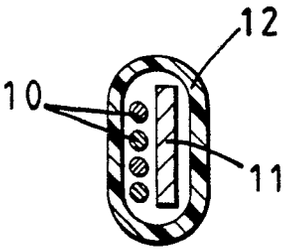

FIG 1

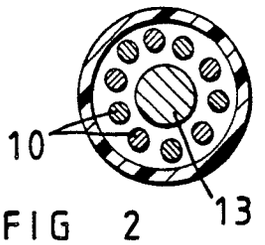

FIG 2

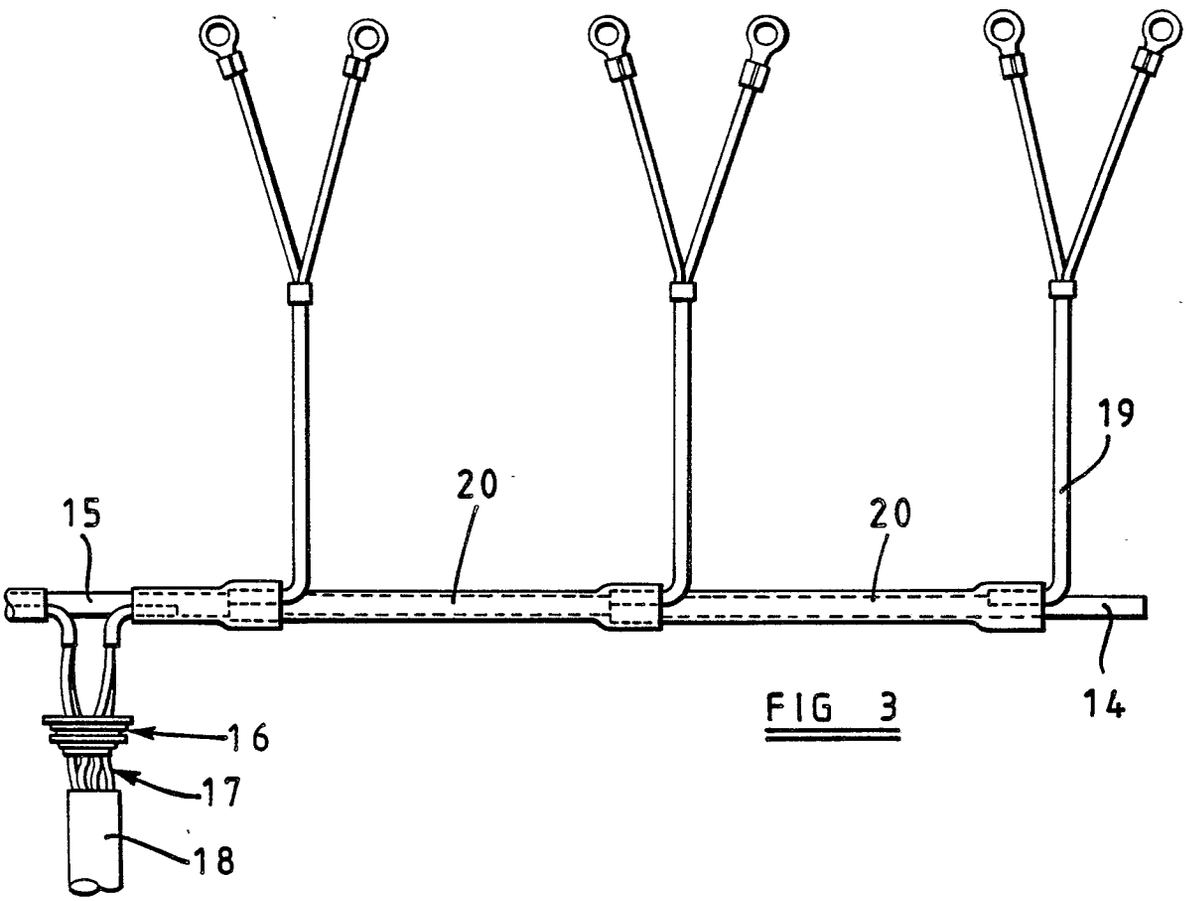

FIG 3