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OPTICAL CABLE HEAD

The present invention in a general manner concerns a connection device of a signal transmission cable for electronic equipment of the type which is used in telephone distributors. These devices are usually called cable heads.

More particularly the invention concerns a cable head intended for an optical cable consisting of a large number of optical fibres.

An optical cable head is described in the French patent application No. 2 694 642 which has been filed by the applicant.

This cable head has a compartment in which the optical fibre cables terminate. Following this termination the cables are untwisted in order to separate the optical fibres of which they consist. Subsequently each optical fibre is individually placed into a winding cassette in which it is coiled in order to form a reserve of fibre which can be used when modifications become necessary later on.

The winding cassettes necessary for the winding up of each fibre of the optical cable are installed horizontally, one on top of the other, supported by a truss or bar of the distributor. These cassettes can be rotated around a vertical axis which is located at the side so as to be able to be spaced toward the front of the distributor in order to facilitate access to the optical fibres.

Each winding cassette has a connector to which the optical fibre wound up in the cassette is attached.

Such optical cable heads are widely used and in general give satisfaction. However, they have the special disadvantage of occupying a projecting space in front of the distributor bar a projecting space which is greater than that needed for the cable heads used for copper wire cables.

Because of this fact, if the optical cable heads are used at the same time as the copper cable heads in the same distributor, a distributor is obtained which has an irregular front surface which makes the access to the copper cable heads difficult.

The present invention then offers a proposal for an optical cable head requiring the same space in front of the distributor as the copper cable heads.

To that end, the invention proposes an optical cable head of the type comprising a terminal device for the said optical cable, means for winding the optical fibres of which the said optical cable is composed and connectors, which is characterised in that it is composed of a single support which consist of two zones forming an angle between them:

- a distribution and connection zone in which the connectors are installed.

- a terminal and winding zone in which the terminal device of the optical cable is installed as well as the means for winding the optical fibres.

a curved return guide which is installed at the junction of the two zones, the said curved return guide having a radius of curvature at least equal to that of the means of winding the optical fibres.

The invention will be better understood thanks to the description which follows and which is given as a non-limiting example with reference to the attached drawings in which:

- figure 1 is a view in perspective of an optical cable head according to the invention, which is located against the bar of the distributor.

- figure 2 is a partial frontal view, with removal of part of the front, of the optical cable head according to the invention.

- figure 3 is a view similar to figure 1 showing the inside of the cable head according to the invention.

- figure 4 shows a juxtaposition of two cable heads according to the invention on a distributor bar.

- figure 5 is a side view of the cable head according to the invention,

- figure 6 is a top view of the cable head according to the invention,

- figure 7 is a view similar to figure 6 for a variant of execution of the cable head according to the invention.

Figure 1 represents the optical cable head according to the invention mounted on bar P of a distributor.

As can be seen on this figure , the cable head according to

the invention is shown in the form of a single support consisting of a frontal zone 1, or distribution and connection zone located along the frontal surface of the distributor and a lateral zone 2, or terminal and winding zone. These zones are arranged in such a manner as to form an angle between them. In the example shown the said zones are at right angles to each other.

The cable head according to the invention consists of a body 3 forming the lateral or terminal zone and a part of the frontal or distribution zone, and of a means of protection of the connections or shield 4.

This shield 4 is installed so that it can pivot with respect to the body 3 so that it can be opened, such as is shown in the dashed lines on figure 1.

In a manner known in itself, the optical cable intended to be taken in charge in the cable head arrives vertically at the rear of the lateral zone 2 following one or the other of the arrows F. It enters into the body 3 by the opening 35 if it enters from above and by opening 36 if it arrives from below.

In figure 2 one can see that the lateral zone 2 is dimensioned in such a manner as to fit into the space available between the bar P of the distributor and the edge G of the channel bordering this bar.

The end of the device 30 which ensures the terminal fixation of the optical cable in the cable head is visible in this figure. In this arrangement the optical cable arrives from the bottom of the drawing following the arrow H.

The terminal device shown in the drawing is the one which constitutes the subject of the application for French patent No. 2 682 775 filed by the applicant. It is to be clearly understood that any other device could have been used without leaving the framework of the present invention.

Also shown on this figure are two of the connectors intended for the positioning of the optical fibres.

The internal arrangement of the cable head according to the invention will now be described using figure 3.

As can be seen on this figure, the body of 3 has a U-shaped

section and consists of a rear wall or bottom 32 and two lateral walls, one the upper 33 and the other the lower 34 into which have been cut the openings 35 and 36 for the entry of the optical cable.

Different from the winding means used in the known optical cable heads, the winding means used in the following cable head which is according to the invention, consist of a single spool on which are wound all the optical fibres which are intended to be connected in the frontal zone.

This winding spool 31 is fixed to the bottom 32 in the part which is located in the lateral zone 2. This spool 31 is cylindrical and its axis is arranged perpendicularly to the said bottom 32, that is to say horizontally. This spool is intended for winding, after they have been untwisted, of the optical fibres which make up the the optical cable which enter into the cable head.

The act of positioning this winding spool according to the invention in the lateral zone arranged at right angles toward the rear permits the reduction of the congestion of the front part of the cable head which is located on the front surface of the distributor.

In a manner known in itself, this spool has a radius of the order of 40 millimetres in order to comply with the standards adopted in France. It is to be clearly understood that this radius can be different so as to be adapted to the characteristics of the optical fibres used. It should be such that it does not sensibly disturb the propagation of signals inside the fibres.

The congestion within the width of the lateral zone is of little importance because of the positioning of this spool with its axis arranged horizontally.

The body 3 also encloses a curved return guide 12 located at the junction between the frontal zone 1 and the lateral zone 2.

This curved return guide, which is better visible in figures 6 and 7 has a rounded shape in such a manner as to ensure the guidance of the optical fibres through the change in direction between the lateral zone 2 and the frontal zone 1. This curved return guide has a radius at least equal to that of the winding spool so as not to disturb the signal propagation inside the optical fibres.

At its end opposite to the lateral zone, the body 3 carries a plate 41 which supports the connectors 40. This plate 41 is arranged vertically and perpendicularly to the bottom 32.

As shown in dashed lines in figure 3, this plate 41 can be installed so that it can move inside body 3, for example by means of tracks which are not shown, in such a manner that they can be withdrawn so that the installation of the connectors 40 can be facilitated.

The different elements described above are shown in more detail in figures 5 to 7.

In figure 5 one can see the terminal device 30 by which the cable 5, which enters from below, is maintained on the cable head according to the invention, in such a manner that the fibres 50 are not subject to any constraint due to displacements of the said cable 5 on the outside of the said cable head.

This terminal device 30 is positioned vertically on the bottom 32 and fixed at two points 39.

In the case where the optical cable enters from above, the terminal device 30 is returned by inverting its position with respect to the said points 39.

One of the fibres 50 constituting the cable 5 has been shown in dashed lines.

This fibre 50 is wound around the spool 31. After having turned around the said spool 31, this fibre passes in front of the curved return guide 12 to enter into the frontal zone where it is fixed to one of the connectors 40 mounted on the plate 41.

The said fibre can be used in the cable head either bare or or sheathed up to the point where it is fixed to connector 40.

In the example shown, the plate 41 carries 12 connectors 40 arranged in two parallel vertical rows of 6 connectors each.

When the cable 5 contains more than 12 optical fibres 50, one can position several cable heads according to the invention, one above the other on the bar P of the distributor. Figure 4 shows the arrangement of two cable heads 10 against a bar P. It is equally possible to conceive of a higher cable head which will permit the installation of a plate which carries the necessary number of

connectors taking care not to increase the dimension projecting from the cable head.

In figure 6, the cable head according to the invention is mounted on a bar P of a different shape and the congestion of the channel has been shown in dotted and dashed lines.

In that figure are shown the second parts 40' of the connectors to which the fibres are fixed which transmit the information in the direction of the users.

It can be seen in this figure that a cap 7 has been provided to close the body 3 and thus protect the optical fibres which it contains. This cap 7 has, in the example shown, a U-shaped section so that it can be positioned in parallel to the bottom 32 of the body 3, with its small sides against the outside of the said body 3. The cap 7 is, for example, attached by a locking mechanism onto the said body 3 by means of pins 37.

In the example of execution shown in the drawing, the protector 4 is supported by the cap 7 by being rotatable around an axis 74. During installation of cable 5 in the cable head, the cap 7 and the protector 4 are withdrawn as shown by the dashed lines 7' so as to allow free access to the interior of the cable head.

When it is necessary, after completion of the cables, to make modifications or to carry out tests which require access only to the second parts 40' of the connectors, one allows the protector 4 to pivot as shown in the dashed lines 4', the rotation proceeding beyond this position 4' in such a manner as to completely uncover the connectors.

As shown in this figure, one can arrange to maintain the protector 4 in the closed position by means of fastening hooks 42 which are intended to hook onto the extensions 38 of body 3.

The cable head according to the invention shown in figure 7 is of a slightly different shape than those shown in the preceding figures. It is shown positioned on a bar P having an I section. In figure 6 cables can be seen passing along the said bar which are intended to be mounted in other cable heads located above or below the cable head shown.

Thanks to the conception of the optical cable head according

to the invention which defines a connection zone intended to be located in front of the distributor and a terminal and winding zone intended to be located in the rear, one limits the space requirement in front of the latter to the front of the distributor bars to the usual space requirement of copper cable heads, to wit about 45 millimetres.

The protector 4 can, in an advantageous manner, be made of a transparent material so as to permit rapid verifications of the cabling without the latter having to be opened.

The claims defining the invention are as follows:

1. - Optical cable head of the type comprising a terminal device of the said optical cable, means of winding the optical fibres of which the said cable is constituted and connectors, characterised in that it consists of a single support comprising two zones which form an angle between them :

- a zone for distribution and connection in which the connectors are located.

- a terminal and winding zone in which are located the terminal device of the optical cable and the means for winding the optical fibres.

- a curved return guide being located at the junction between the two zones, the said curved return guide having a radius of curvature at least equal to that of the means of winding.

2. - Cable head according to claim 1, characterised in that the winding means consist of a winding spool for optical fibres, which are installed with their axis being horizontal.

3. - Cable head according to claim 1 or claim 2, characterised in that the distributor and connection zone comprises a plate which is installed vertically and supports the connectors.

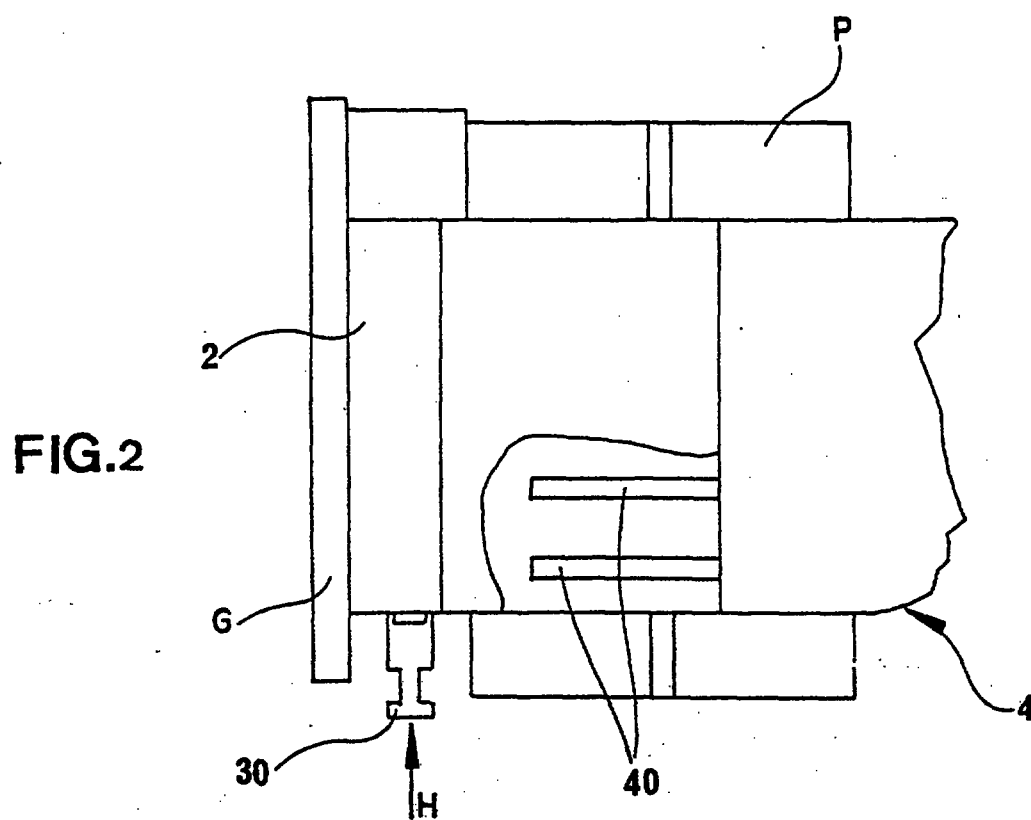
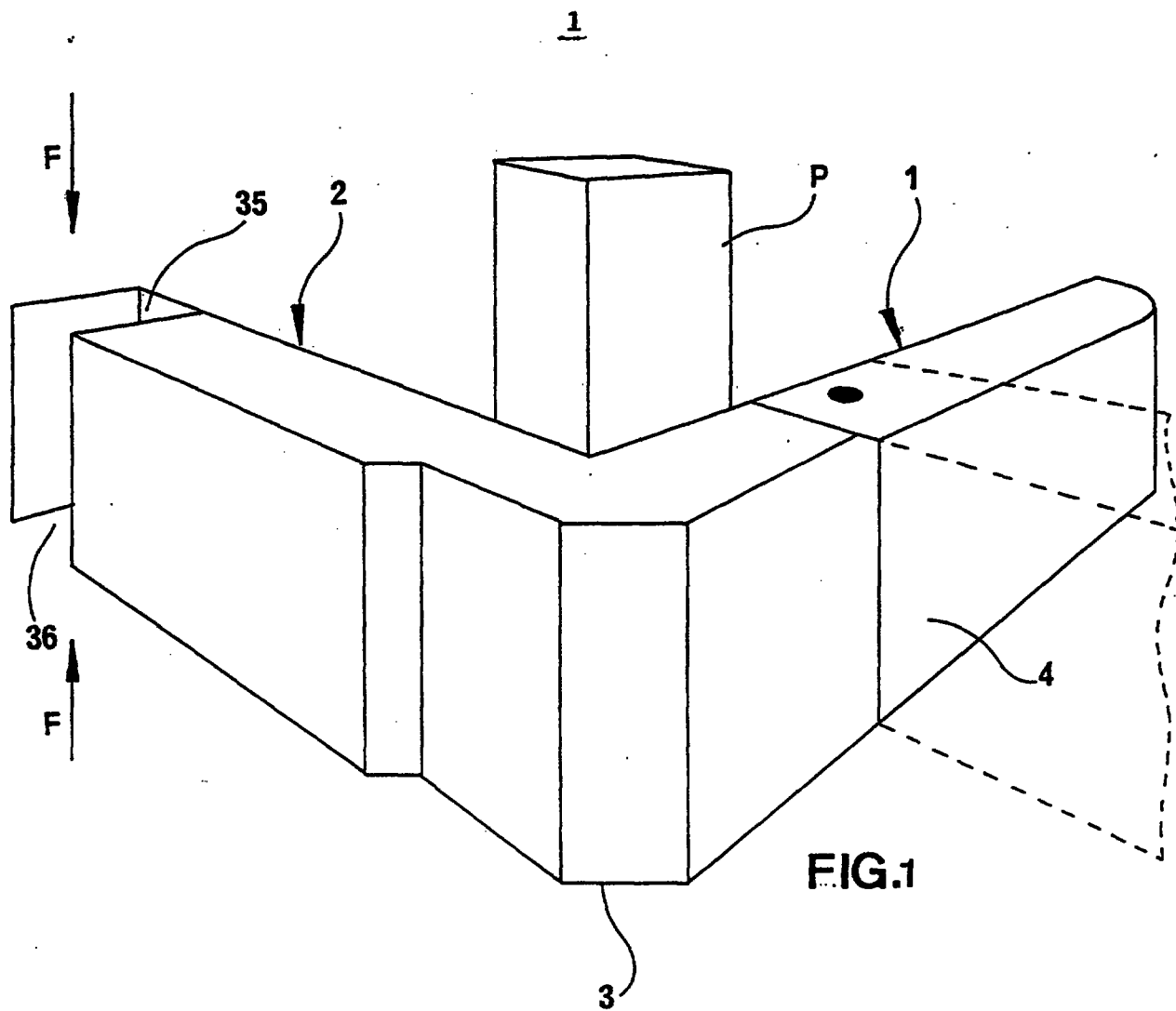
4. - Cable head according to claim 3, characterised in that the said plate is mounted so it is mobile in the distribution zone.

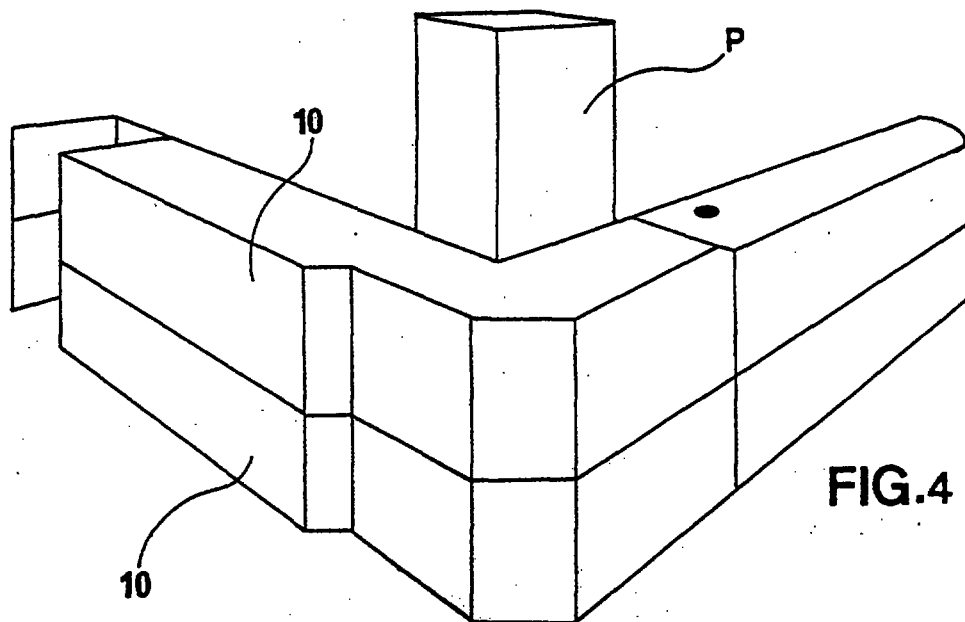
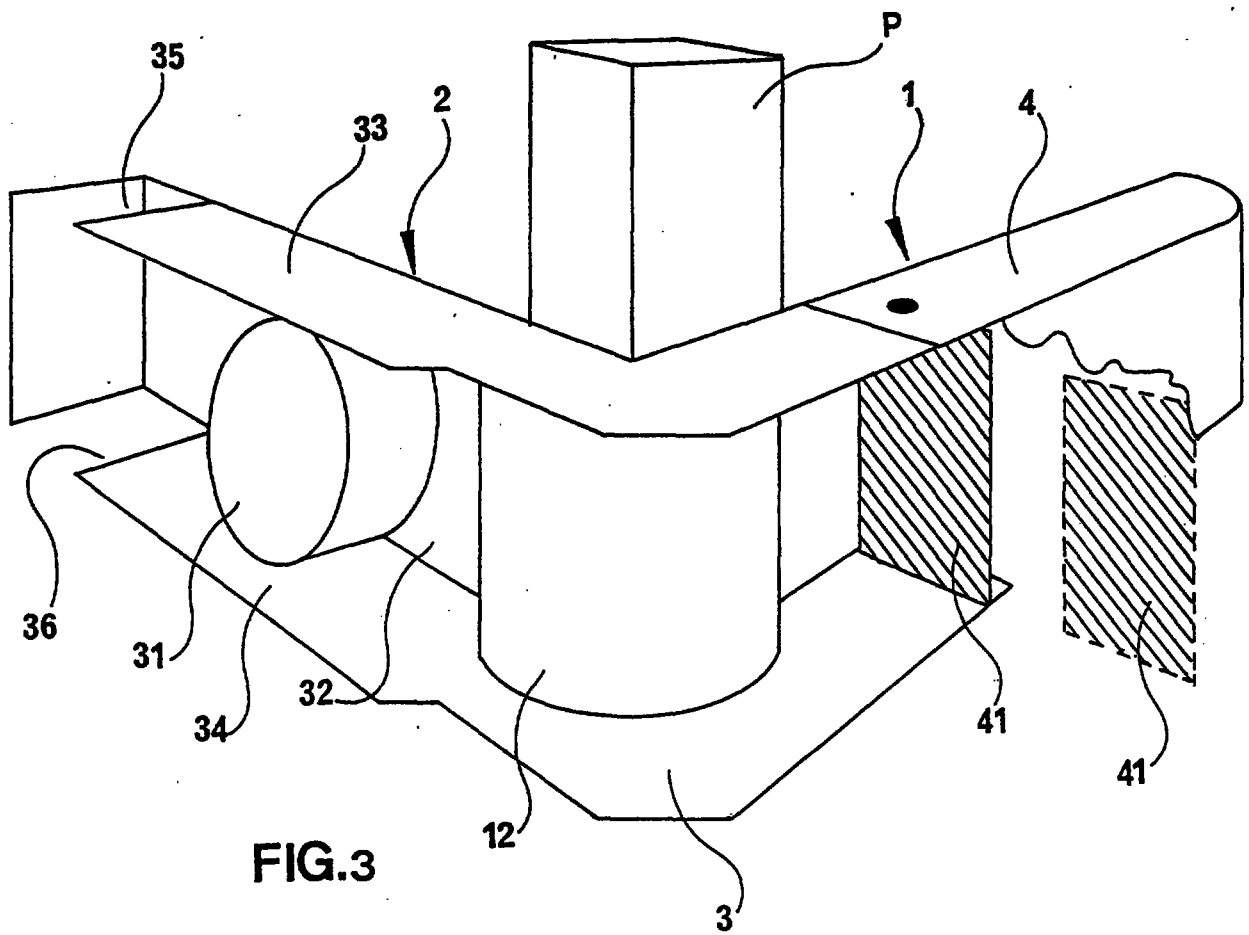
5. - Cable head according to any of the preceding claims, characterised in that it consists of a body which forms the terminal zone and the zone for the distribution compartment, and of a protector.

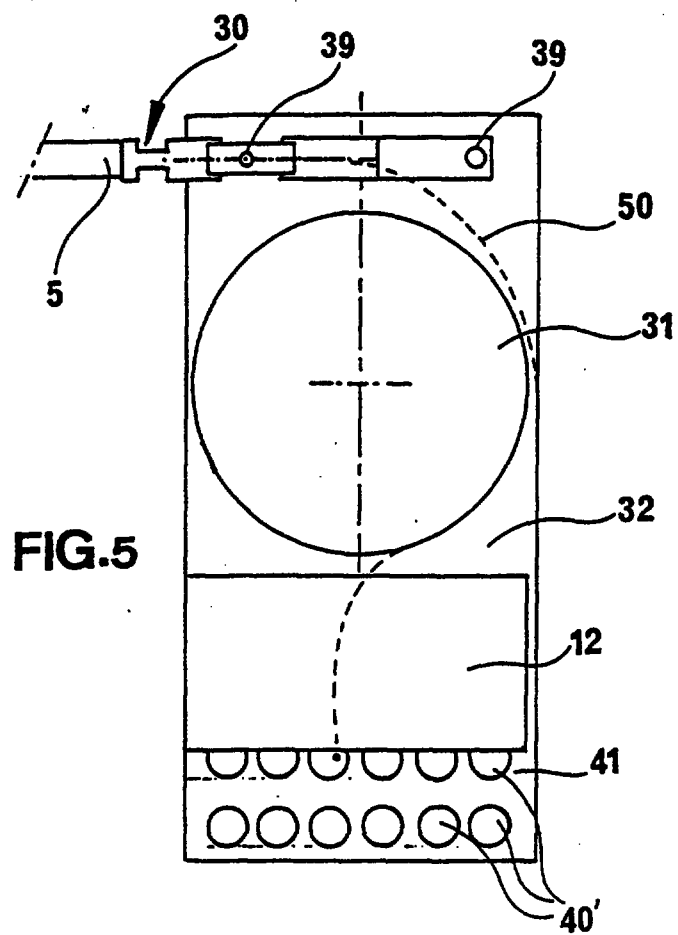
6. - Cable head according to claim 5, characterised in that the protector is mounted so it can pivot with respect to the body.

7. - Cable head according to claim 5 or claim 6, characterised in that a cap closes off the body so as to protect the optical fibres which it encloses.

8. - Cable head according to claim 7, characterised in that the protector is attached to the cap by being rotatable around an axis.









ABSTRACT

Optical Cable Head

Optical cable head of the type which comprises a terminal device for the said optical cable, winding means for the said optical fibres of which the said optical cable and connectors are constituted.

The head consists of a single support comprising two zones (1, 2) which form an angle between them :

- a distribution and connection zone (1) in which the connectors are installed,
- a terminal and winding zone (2) in which the terminal device is installed as well as the means for winding the optical fibres.

a curved return guide which is installed at the junction between the two zones (1, 2), the said curved return guide having a radius of curvature at least equal to that of the winding devices.

Figure 3.