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(12) # EUROPEAN PATENT SPECIFICATION

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(54) **Method for covering cables with sheaths for corrosion protection and/or aesthetic reasons.**

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Description

This invention relates to improvements in and relating to a method for fitting corrosion protective and/or aesthetic sheaths on tension members of suspension bridges, suspended roofs, cable stayed bridges and the like.

The circumferential surface of the tension members of this sort are usually covered with generally cylindrical sheaths for protection against corrosion. However, such corrosion protection sheaths are often found to be inconvenient since it becomes difficult to take up a tension member on a reel for storage or for other purposes once a sheath is fitted on the tension member. Therefore, it has been the conventional procedure to thread a tension member through cylindrical sheaths which are provided on scaffolds which are erected at suitable intervals along the tension member to be installed for protection against corrosion, or to fit sheaths on an installed cable by climbing on a scaffold which is provided along the entire length of the cable. Thus, the conventional sheaths invariably require a scaffold or scaffolds for fitting them on a cable, and necessitate the building of scaffolds on a large scale for long cables, resulting in high construction costs and an unduly long construction period.

The present invention aims to solve the above-mentioned problems or difficulties. It is a more specific object of the present invention to provide a method for covering tension members consisting of bundles of steel wires, strands, wire ropes or high strength bars (hereinafter called "cables") with corrosion protection and/or aesthetic sheaths in a simplified manner, which does not require provision of a scaffold for fitting the corrosion protective sheaths on cables and which can realize significant reductions of the cost and time of the cable installation.

According to the invention, there is provided a method for fitting a generally cylindrical corrosion protective and/or aesthetic sheath on tension members of suspension bridges, suspended roofs, cable stayed bridges and the like, said method comprising:

fitting a sheath unit on or near one end of a cable;

shifting the position of the fitted sheath unit toward the other end of the cable;

fitting a fresh sheath unit similarly on the cable in continuation from the preceding sheath unit; and

repeating fitting of a fresh sheath unit and shift of preceding sheath until said cable is covered with said sheath units substantially over the entire length thereof.

In a preferred form of the invention, each corrosion protective and/or aesthetic sheath unit consists of a pair of split segments formed from a synthetic resin such as polyethylene or a metal such as copper, aluminium, stainless steel or the like, and is fitted on a cable such that the split segments are located in staggered positions along the axis of the cable.

The above and other objects, features and advantages of the present invention will become apparent from the following description, taken in conjunction with the accompanying drawings, which show by way of example preferred embodiments of the invention.

In the accompanying drawings:

FIGURE 1 is a schematic front view of an embodiment of the invention;

FIGURE 2 is a schematic perspective view of split sheath segments constituting a train of sheath units;

FIGURE 3 is a schematic perspective view of a sheath of a different construction;

FIGURES 4, 5(A), 5(B), 5(C), 6(A), and 6(B) are schematic sectional views showing various means for integrally connecting the sheath and cable together;

FIGURES 7 and 8 are schematic sectional views showing the constructions at the terminal ends of a cable;

FIGURE 9 is a schematic perspective view showing another embodiment of the invention;

FIGURE 10 is a schematic sectional view taken on line X—X of FIGURE 9;

FIGURE 11 is a schematic perspective view showing an example of the segment lifting means; and

FIGURE 12 is a schematic sectional view a completely sheathed cable.

Referring to the drawings and first to FIGURE 1, there is shown part of a cable stayed bridge 1 having a tension member 2, which consists of a bundle of steel wires, strands, wire ropes or high strength bars (hereinafter called "a cable") tensioned between an upper end portion of a tower 10 and a beam 11 of the bridge. A cylindrical protective sheath unit 3 of a predetermined length is fitted on the circumference of a lower end portion of the cable 2 immediately above the beam 11. The sheath unit 3 consists of a couple of split segments 30 of a synthetic resin like polyethylene or a metallic material such as copper, aluminium, stainless steel or the like (see FIGURE 2). After fitting the split segments 30 on the cable 2, they are secured to each other by bolts, rivets, press-in fit or welding in such a manner as to hold the cable 2 from opposite sides.

The sheath unit 3 thus fitted on the cable 2 is shifted upwards along the cable by a distance corresponding to its length by pulling a rope 13 which is passed around a pulley 12 at the upper end of the tower 10, and then a fresh protective sheath unit 3 is fitted on the cable 2 in the same manner. The upper end of the lower or succeeding sheath unit 3 is fitted into the lower end of the preceding sheath unit 3, and the overlapped end portions of the two sheaths units 3 are fastened to each other by bolts or other suitable means. If desired, the connecting end portions of the preceding and succeeding sheath units may be secured to each other by butt welding. The two connected sheath units 3 are slid upwards by pulling the rope 13 again, and another fresh protective sheath unit 3 is fitted on the cable 2 and

connected to the lower end of the second unit 3. In this manner fresh protective and/or aesthetic sheath units are connected one after another until the cable 2 is covered with the sheath unit 3 over the entire length thereof.

In this instance, instead of lifting by the rope 13, the connected sheath units 3 may be pushed up each time by a distance corresponding to their unit length, or alternatively the first sheath unit 3 may be fitted on the upper end of the cable 2 which is accessible from the top end portion of the tower 10, successively lowering the sheath units 3 along the cable 2 after fitting and connecting fresh sheath units 3 to the upper end of the preceding units 3. Further, it is to be understood that, instead of a pair of split segments 30, each sheath unit may be constituted by three or more segments which can be assembled into a cylindrical shape with a number of pieces in the longitudinal direction, if desired, for fitting the same on the cable 2 by elastic deformation. Furthermore, as shown particularly in Figure 3, a sheath unit 3 of a desired length can be formed by spirally wrapping a rolled covering strip 31 around the circumference at one end of a cable 2 and fastening the overlapped portions of the covering strips 31 by rivets or other suitable means.

After forming a sheath unit 3 of the necessary length at one end of the cable 2 in this manner, the sheath unit is shifted toward the other end of the cable 2, and a fresh sheath unit 3 is formed contiguously to the preceding unit 3. Consequently, there is no necessity for providing a scaffold or scaffolds as required by the conventional methods, and it becomes possible to reduce the installation cost as well as the time of construction markedly.

In order to lessen the frictional resistance at the time of moving the joined sheath units toward the other end of the cable 2, it is desired to leave a predetermined clearance (normally about a 2—60 mm gap) between the inner surfaces of each sheath unit 3 and the circumference of the cable 2. However, if such a clearance exists after installation, the sheath 3 may vibrate independently of the cable 2 due to the action of winds or other external disturbances, so that there is a possibility of noise being produced or the sheath being damaged. These troubles can be precluded by integrating the sheath 3 and cable 2, for example by providing cushion material 20 such as sponge, sponge rubber, curled stainless steel wire or a spring on the inner surface of the sheath 3 or on the circumferential surface of the cable 2 as shown in FIGURE 4. With this arrangement the protective and/or aesthetic sheath 3 can be moved with a small frictional resistance due to elastic deformation of the cushion material 20, and, after installation, the sheath 3 and cable 2 are integrally joined to one another by the cushion material 20. Similar effects can be obtained by providing, instead of the cushion material 20, an age-hardening type tacky material such as silicone, foamable urethane or the like. It is also possible to lay one or a plurality of inflatable tubes 21 along the cable 2 as shown in FIGURE 5(A), inflating the tubes 21 by introducing a filler 22 thereinto as shown in FIGURES 5(B) and 5(C) until the tubes 21 completely support the sheath 3 on cable 2 to connect them integrally to each other. Alternatively, the cable 2 may be temporarily held in a reduced diameter by compressing opposite end portions of the cable 2 with clamps 23 while the sheaths are fitted thereon as shown particularly in FIGURE 6(A), and removing the clamps 23 afterwards so that the cable 2 may be integrally connected to the sheath 3 by restoration of its normal diameter as shown in Figure 6(B).

As illustrated in FIGURE 7, the upper and lower ends of the cable 2 are fixed by sockets 14, and each end portion of the connected sheath unit is fitted on a pipe 15 of polyethylene, steel or the like which is retained in the socket 14, thereby preventing each end portion of the cable 2 being exposed to the weather and at the same time improving the corrosion resistance of each end portion of the cable 2 and its appearance. In order to improve the corrosion resistance of each end portion of the cable 2 still further, it is desirable to fill the pipes 15 with a filler material 16 of a synthetic resin, rubber or the like. Further, a water drain hole 17 may be provided at the lower end of the sheath 3 at a position opposing a slant surface of the filler material 16 to drain water which might enter the sheath 3 through its riveted joints.

Shown in FIGURE 8 is another embodiment in which each end of the sheath 3 is fitted in a trumpet sheath 18 which is provided on the anchorage attachment. In the case where there is a difference in linear thermal expansion coefficient between the cable 2 and sheath 3, it is desirable to provide a space S between the upper end of the sheath and socket 14 thereby to absorb the difference in the thermal expansions and contractions as shown in FIGURES 7 and 8, or to provide an extensible joint in an intermediate portion of the sheath 3. In the case of a very long cable 2, there are possibilities of a corrosion resistant layer of the cable 2 being damaged due to sliding movements of the cable 2 within the sheath caused by thermal expansion or contraction. This can be suitably prevented by the provision of the above-mentioned cushioning material 20. Accordingly, it is preferred to provide the cushion material 20 between the circumferential surface of the cable 2 and the inner surface of the sheath 3 in the embodiments shown in FIGURES 4, 7 and 8. Where it is intended to bore apertures or tapped holes in the sheath units 3 of FIGURES 2 and 3 on a construction site for receiving rivets or bolts which fasten the connecting portions of the split sheath segments 30 or of the adjacent sheath units 3, it is desirable to provide projections on the inner surfaces of the sheaths 3 or to maintain a clearance of a predetermined gap between the sheath units 3 and the cable 2 by interposition of a spacer or other suitable means to prevent the cable 2 from being damaged by a drill or tools.

Referring to FIGURE 9, there is shown a further embodiment to the invention, in which the opposing semi-cylindrical segments of each sheath unit are connected in staggered positions along the length of the cable. More specifically as illustrated in FIGURE 9, a segment 30 of a predetermined length and a segment 31 of a half length are fitted on the lower end of a cable 2 from opposite sides thereof and connected to each other to form an initial end of a sheath. The long and short segments 30 and 31, which are aligned with each other at the upper ends but have their lower ends terminated at staggered positions in the longitudinal direction, have the longitudinal meeting edges fastened to each other by rivets 32 or other suitable fixing means such as bolts, screws, fit joints, slits or welding. In this instance, a bell-shaped split guide tube 33 is fitted on the cable 2 beforehand to connect thereto the alignment upper ends of the segments 30 and 31. In a manner similar to the foregoing embodiments, the connected sheath segments 30 and 31 are slid upward by pulling a rope 13, and a segment of the next sheath unit is fastened to the longitudinal edges of the lower half of the longer segment 3 contiguously to the lower end of the short segment 31. Namely, the segments 30 and 30' of each sheath unit are connected to each other and to a segment of a preceding or succeeding sheath unit in longitudinally staggered positions by rivets 32 or other fastening means which secure the longitudinal meeting edges of the respective segments.

In this manner, the segments 30 and 30' of the succeeding sheath units are connected one after another at the lower end of the cable 2, while upwardly shifting the connected sheath units after connection of a single or a couple of fresh segments by a distance corresponding to an increment in length of the connected sheath train. Since the segments 30 and 30' are connected to each other as well as to a staggered segment 30 and 30' of a longitudinally adjacent sheath unit, there is no necessity for fastening means for connecting the abutted ends of longitudinally adjacent sheath segments and therefore the connecting work can be simplified to a significant degree. In this case, in order to prevent invasion of water through the abutted ends of the adjacent sheath segments, it is desirable to fit around the abutted ends a hoop strap 35 with a backup material 36 such as silicone rubber, duplex adhesive tape or the like, fixing the hoop strap 35 in position by a caulking strip 37 or the like (FIGURE 9 and 10). The hoop strap 35 can be omitted in case the opposing end portions of the adjacent sheath segments are so shaped as to be connected with each other by fitting engagement.

For lifting up the connected segments by the rope 13, there may be employed a cable grip 40 of a net-like sock which is fitted around the segments 30 and 31 of the leading sheath unit, and has loops at its force end connected to the rope 13 so that the grip 40 is tightened to lift the sheath segments 30 and 31 as the rope 13 is wound up by a winch.

In this manner, the connection of fresh sheath segments and the upward shift of the connected sheath segments are repeated alternately until the segments 30 and 31 at the leading end reach the upper end of the cable 2, forming a continuous cylindrical sheath A over the entire length of the cable 2 as shown particularly in Figure 12. The lower ends of the opposing sheath segments at the terminal end of the sheath A are compensated with each other by the use of a short segment 31 in the same manner as at the leading end of the sheath A, and the opposite ends of the sheath A are connected respectively to connecting pipes 42 on sockets 41 through the trumpet sheath 43.

Claims

1. A method for fitting a generally cylindrical corrosion protective and/or aesthetic sheath on tension members of suspension bridges, suspended roofs, cable stayed bridges and the like, said method comprising:

fitting a sheath unit (3) on or near one end of a cable (2);

shifting the position of the fitted sheath unit toward the other end of the cable;

fitting a fresh sheath unit (3) similarly on the cable in continuation from the preceding sheath unit; and

repeating fitting of a fresh sheath unit and shift of preceding sheath unit until said cable is covered with said sheath units substantially over the entire length thereof.

2. A method as set forth in claim 1, wherein said cable consists of a plurality of steel wires, strands, wire ropes or high strength bars, and said sheath unit consists of a pair of semi-cylindrical split segments (30) formed from a synthetic resin material including polyethylene or a metallic material including copper, aluminium or stainless steel.

3. A method as set forth in claim 1 or 2, wherein a clearance of a predetermined gap, normally in the range of 2—60 mm, is provided between the inner surface of each sheath unit and the circumferential surface of said cable for the purpose of reducing frictional resistance at the time of shifting said sheath unit along said cable.

4. A method as set forth in claim 1 or 2, wherein said sheath unit is integrally connected to the circumference of said cable by a cushion material (20) including sponge, foamed rubber, curled stainless steel wire or a spring, provided on the inner surface of said sheath unit or on the circumferential surface of said cable.

5. A method as set forth in claim 1 or 2, wherein said sheath unit is integrally connected to the circumference of said cable by an age-hardening type tacky material, including silicone or foamable urethane, applied on the inner surface of said sheath unit or on the circumferential surface of said cable.

6. A method as set forth in claim 1 or 2, wherein at least one inflatable tube (21) is embedded between said sheath units and cable, and a filler material (22) is introduced into said inflatable tube

after fitting said sheath units on said cable, thereby expanding said tube to support said sheath units on said cable for connecting same integrally with each other.

7. A method as set forth in claim 1, comprising:

forming each one of said sheath units from a plural number of split segments; and

fitting split segments of each sheath unit on said cable from opposite sides thereof in staggered positions in the longitudinal direction of said cable and fastening longitudinal meeting edges of said split segments to each other and to a segment of a preceding or succeeding sheath unit to form on said cable a cylindrical sheath consisting of a series of longitudinally connected sheath units having the opposite ends of the respective split segments abutted against split segments of an adjacent sheath unit in staggered positions.

8. A method as set forth in claim 7, wherein a hoop strap (35) is fitted on and around the abutted ends of said split segments of adjacent sheath units and fixed in position by a caulking strip (37) said hoop strap being held in tight contact with the circumferential surfaces of said split segments through a back-up material (36) applied on the inner surface of said hoop strap.

9. A method as set forth in claim 8, wherein said back-up material is silicone rubber.

10. A method as set forth in claim 8, wherein said back-up material is a duplex adhesive tape.

11. A method as set forth in claim 8, wherein said abutted ends of split segments of adjacent sheath units are connected by fitting engagement with each other.

12. A method as set forth in any preceding claim wherein said sheath units fitted on said cable are successively pulled upward by a rope (13) connected at an initial end of said sheath.

13. A method as set forth in any of claims 1 to 11, wherein said sheath units fitted on said cable are successively pushed up each time by a predetermined distance along said cable.

14. A method as set forth in any of claims 1 to 11, wherein said sheath units are fitted one after another on an upper end portion of said cable and successively moved toward the lower end of said cable.

Patentansprüche

1. Verfahren zur Befestigung einer im wesentlichen zylindrischen Hülle zum Korrosionsschutz und/oder zur Ästhetik auf Zugelementen von Hängebrücken, abgehängten Dächern, mit Seilen verstrebten Brücken und dergleichen, gekennzeichnet durch Befestigen einer Hülleneinheit (3) auf oder nahe einem Ende eines Seils (2); Verschieben der Stellung der befestigten Hülleneinheit in Richtung auf das andere Ende des Seiles; Befestigen einer neuen Hülleneinheit (3) in ähnlicher Weise auf dem Seil in Fortsetzung von der vorangehenden Hülleneinheit; und Wiederholen des Befestigens einer neuen Hülleneinheit und des Verschiebens der vorangehenden Hülleneinheit, bis das Seil im wesentlichen über seine gesamte Länge von den Hülleneinheiten bedeckt ist.

2. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß das Seil aus einer Vielzahl von Stahldrähten, Litzen, Drahtseilen oder hochfesten Stangen besteht und daß die Hülleneinheit aus einem Paar halbzylindrischen geteilter Segmente (30) besteht, die aus einem synthetischen Harzmaterial einschl. Polyethylen oder einem metallischen Material, einschl. Kupfer, Aluminium oder rostfreier Stahl gebildet sind.

3. Verfahren nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß ein Zwischenraum mit einem vorbestimmten Spalt, normalerweise in dem Bereich von 2—60 mm, zwischen der Innenfläche der Hülleneinheit und der Umfangsfläche des Seiles für das Verringern des Reibungswiderstandes beim Verschieben der Hülleneinheit längs des Seiles vorgesehen wird.

4. Verfahren nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß die Hülleneinheit einstückig mit dem Umfang des Seiles über ein Dämpfungsmaterial (20) verbunden wird, welches aus Schaumstoff, Schaumgummi, spiralförmig gedrehtem rostfreien Stahl oder einer Feder besteht, das bzw. die auf der Innenfläche der Hülleneinheit oder auf der Umfangsfläche des Seils vorgesehen wird.

5. Verfahren nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß die Hülleneinheit einstückig mit dem Umfang des Seiles über ein kaltaushärtendes zähes Material verbunden wird, welches aus Silikon oder schäumbarem Urethan besteht, das auf die Innenfläche der Hülleneinheit oder auf den Außenumfang des Seiles aufgebracht wird.

6. Verfahren nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß wenigstens ein aufblasbares Rohr (21) zwischen den Hülleneinheiten und dem Seil eingebettet wird, und daß ein Füllmaterial (22) in das aufblasbare Rohr nach dem Befestigen der Hülleneinheiten auf dem Seil eingeführt wird, um dadurch das Rohr für das Halten der Hülleneinheiten auf dem Seil zu deren einstückigen Verbindung miteinander auszudehnen.

7. Verfahren nach Anspruch 1, gekennzeichnet durch Herstellen von einzelnen Hülleneinheiten aus einer Vielzahl von geteilten Segmenten; und Befestigen der geteilten Segmente jeder Hülleneinheit auf dem Seil von dessen gegenüberliegenden Seiten in versetzten Stellungen in Längsrichtung des Seiles und Befestigen der sich in Längsrichtung treffenden Ränder der geteilten Segmente aneinander und an einem Segment einer vorangehenden oder nachfolgenden Hülleneinheit, um auf dem Seil eine zylindrische Hülle zu bilden, die aus einer Reihe von in Längsrichtung verbundenen Hülleneinheiten besteht, wobei die gegenüberliegenden Enden der jeweiligen geteilten Segmente gegen geteilte Segmente einer angrenzenden Hülleneinheit in versetzten Stellungen anstoßen.

8. Verfahren nach Anspruch 7, dadurch gekennzeichnet, daß ein Reifenband (35) auf und um die aneinanderstoßenden Enden der geteilten Segmente von benachbarten Hülleneinheiten ange-

bracht und in seiner Stellung durch ein Nahtdichtungsband (37) gehalten wird, wobei das Reifenband in einer dichten Brührung mit den Umfangsflächen der geteilten Segmente durch ein Haltematerial (36) auf der inneren Oberfläche des Reifenbandes gehalten wird.

9. Verfahren nach Anspruch 8, dadurch gekennzeichnet, daß das Haltematerial aus Silikonkautschuk besteht.

10. Verfahren nach Anspruch 8, dadurch gekennzeichnet, daß das Haltematerial aus einem Doppelklebeband besteht.

11. Verfahren nach Anspruch 8, dadurch gekennzeichnet, daß die aneinanderstoßenden Enden der geteilten Segmente von benachbarten Hülleneinheiten miteinander im passendem verbunden sind.

12. Verfahren nach einem vorangehenden Anspruch, dadurch gekennzeichnet, daß die Hülleneinheiten auf dem Seil nacheinander mittels eines Taues (13) hochgezogen werden, das an dem Anfangsende der Hülle befestigt ist.

13. Verfahren nach einem der Ansprüche 1—11, dadurch gekennzeichnet, daß die auf dem Seil befestigten Hülleneinheiten nacheinander jedesmal um eine vorbestimmte Entfernung längs des Seiles hochgeschoben werden.

14. Verfahren nach einem der Ansprüche 1—11, dadurch gekennzeichnet, daß die Hülleneinheiten eine nach der anderen auf einem oberen Endabschnitt des Seiles befestigt und nacheinander in Richtung auf das untere Ende des Seiles bewegt werden.

Revendications

1. Procédé pour adapter une gaine de protection contre la corrosion et/ou de décoration cylindrique dans son ensemble, sur des organes de tension de ponts suspendus, de toits suspendus, de ponts haubannés et autres, ledit procédé consistant: à adapter un élément (3) de gaine sur une extrémité ou au voisinage d'une extrémité d'un câble (2), à déplacer la position de l'élément de gaine adapté vers l'autre extrémité du câble; à adapter un nouvel élément de gaine (3) d'une façon analogue sur le câble à la suite de l'élément de gaine précédent; et à répéter l'adaptation d'un nouvel élément de gaine et le déplacement de l'élément de gaine précédent jusqu'à ce que ledit câble soit recouvert par lesdits éléments de gaine sensiblement sur toute sa longueur.

2. Procédé suivant la revendication 1, dans lequel ledit câble consiste en plusieurs fils d'acier, torons, câbles métalliques ou barres à haute résistance, et lesdits éléments de gaine consistent en une paire de segments fendus semi-cylindriques (30) formés d'une résine synthétique telle que du polyéthylène ou un matériau métallique tel que du cuivre, de l'aluminium ou de l'acier inoxydable.

3. Procédé suivant la revendication 1 ou 2, dans lequel un jeu d'un intervalle prédéterminé, normalement dans la plage de 2 à 60 mm, est prévu entre la surface interne de chaque élément de gaine et la surface circonférentielle dudit câble afin de diminuer la résistance due au frottement au moment de l'élévation dudit élément de gaine le long dudit câble.

4. Procédé suivant la revendication 1 ou 2, dans lequel ledit élément de gaine est relié solidairement à la circonférence dudit câble par un matériau (20) d'amortissement comprenant de la mousse, du caoutchouc mousse, des fils d'acier inoxydable ondulés ou un ressort, prévu sur la surface interne dudit élément de gaine ou sur la surface circonférentielle dudit câble.

5. Procédé suivant la revendication 1 ou 2, dans lequel ledit élément de gaine est relié solidairement à la circonférence dudit câble par un matériau poisseux du type durcissant par vieillissement, comprenant du silicone ou de la mousse d'uréthane, appliqué sur la surface interne dudit élément de gaine ou sur la surface conconférentielle dudit câble.

6. Procédé suivant la revendication 1 ou 2, dans lequel au moins un tube gonflable (21) est logé entre lesdits éléments de gaine et le câble, et un matériau (22) de charge est introduit dans ledit tube gonflable après adaptation desdits eléments de gaine sur ledit câble, dilatant ainsi ledit tube pour maintenir lesdits eléments de gaine en contact avec ledit câble et pour les relier solidairement l'un à l'autre.

7. Procédé suivant la revendication 1, suivant lequel on forme chacun desdits eléments de gaine à partir de plusieurs segments fendus; en on adapte les segments fendus de chaque élément de gaine sur ledit câble de part et d'autre de celui-ci dans des positions étagées dans le sens longitudinal dudit câble et on fixe les bords longitudinaux adjacents desdits segments fendus les uns aux autres et sur un segment d'un élément de gaine précédent ou suivant pour former sur ledit câble une gaine cylindrique constituée d'une série d'eléments de gaine reliés longitudinalement, les extrémités opposées des segments fendus respectifs étant en butée contre des segments fendus d'un élément adjacent de gaine dans des positions étagées.

8. Procédé suivant la revendication 7, dans lequel une sangle de cerclage (35) est adaptée sur les extrémités en butée desdits segments fendus des eléments de gaine adjacents et autour de celles-ci, et maintenue en position par une bande d'étanchéité (37), ladite sangle de cerclage étant maintenue en contact étroit avec les surfaces circonférentielles desdits segments fendus par l'intermédiaire d'un matériau d'appui (36) appliqué sur la surface interne de ladite sangle de cerclage.

9. Procédé suivant la revendication 8, dans lequel ledit matériau d'appui est du caoutchouc silicone.

10. Procédé suivant la revendication 8, dans lequel ledit matériau d'appui est une bande adhésive double face.

11. Procédé suivant la revendication 8, dans lequel lesdites extrémités en butée des segments

fendus des éléments de gaine adjacents sont reliées ensemble par emmanchement.

12. Procédé suivant l'une quelconque des revendications précédentes, dans lequel lesdits éléments de gaine adaptés sur ledit câble sont tirés successivement vers le haut par une corde (13) reliée à une extrémité initiale de ladite gaine.

13. Procédé suivant l'une quelconque des revendications 1 à 11, dans lequel lesdits éléments de gaine adaptés sur ledit câble sont poussés successivement à chaque fois d'une distance prédéterminée le long dudit câble.

14. Procédé suivant l'une quelconque des revendications 1 à 11, dans lequel lesdits éléments de gaine sont adaptés l'un après l'autre sur une partie d'extrémité supérieure dudit câble et déplacés successivement vers l'extrémité inférieure dudit câble.

Fig. 1

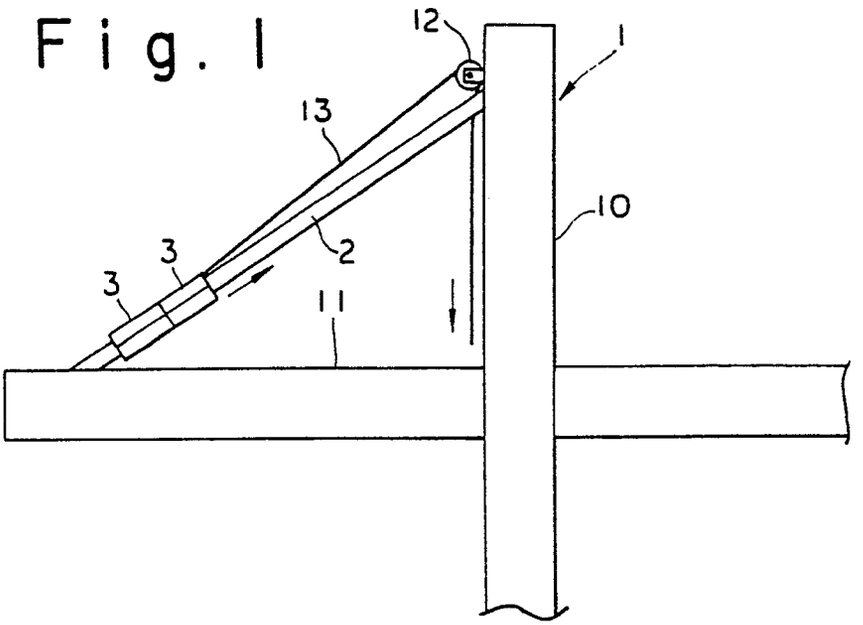

Fig. 2

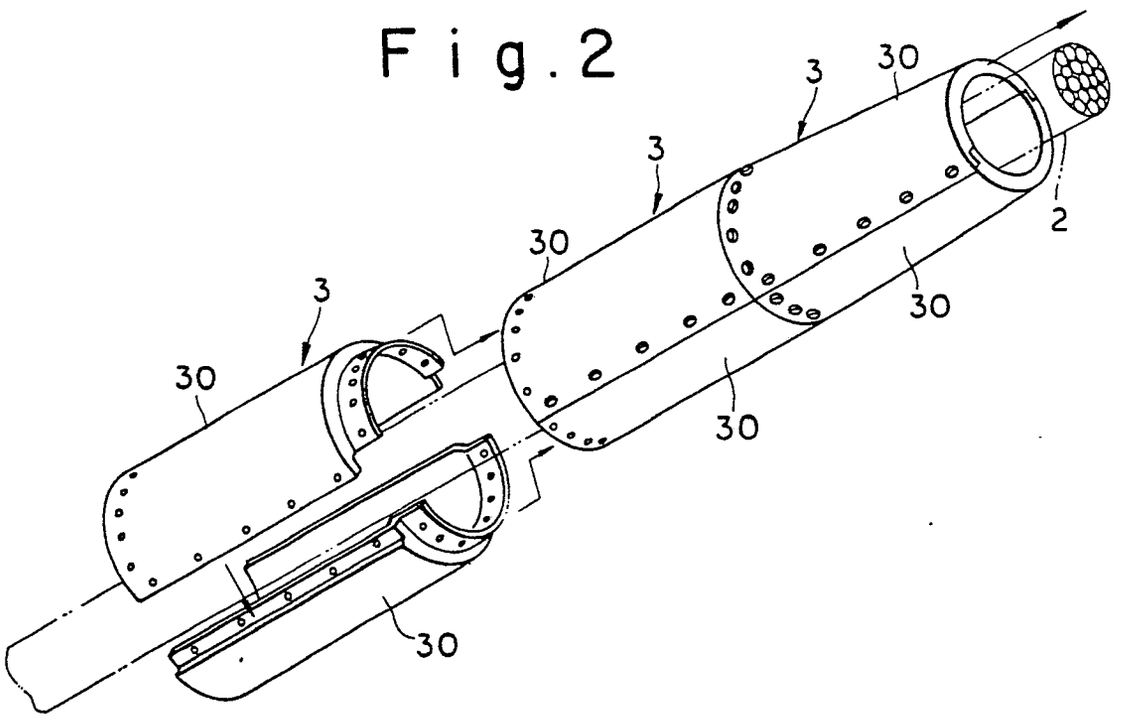

Fig. 3

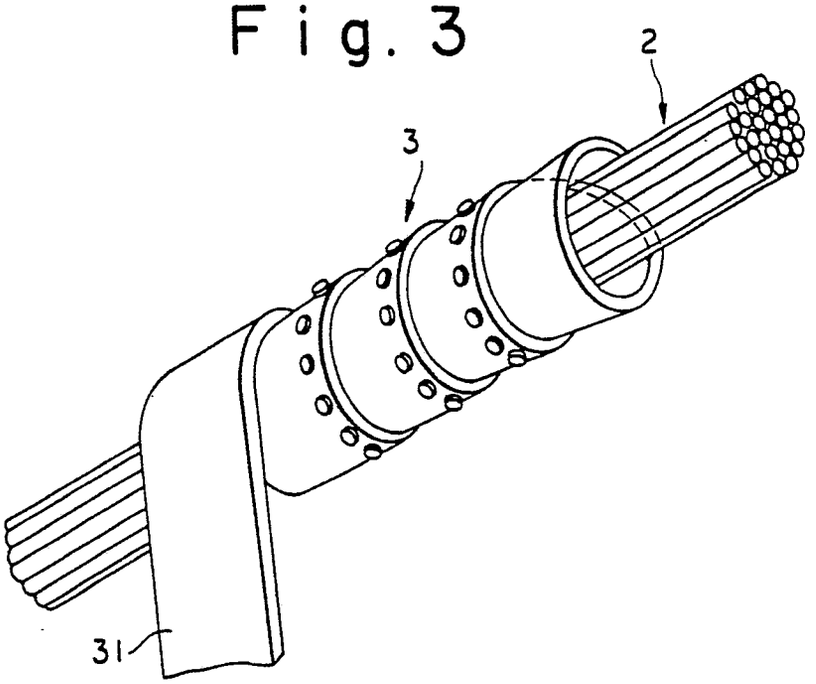

Fig. 4

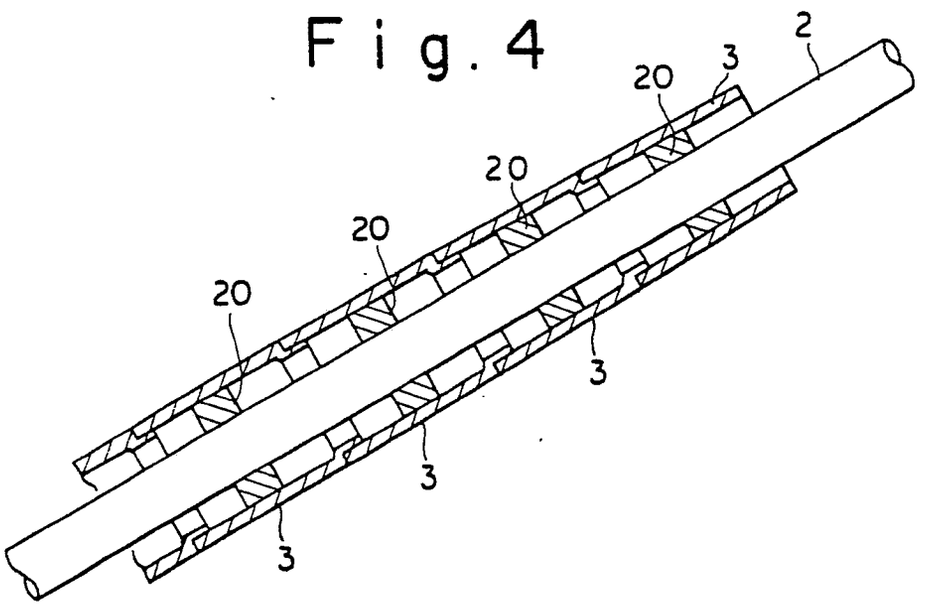

Fig. 5(A)

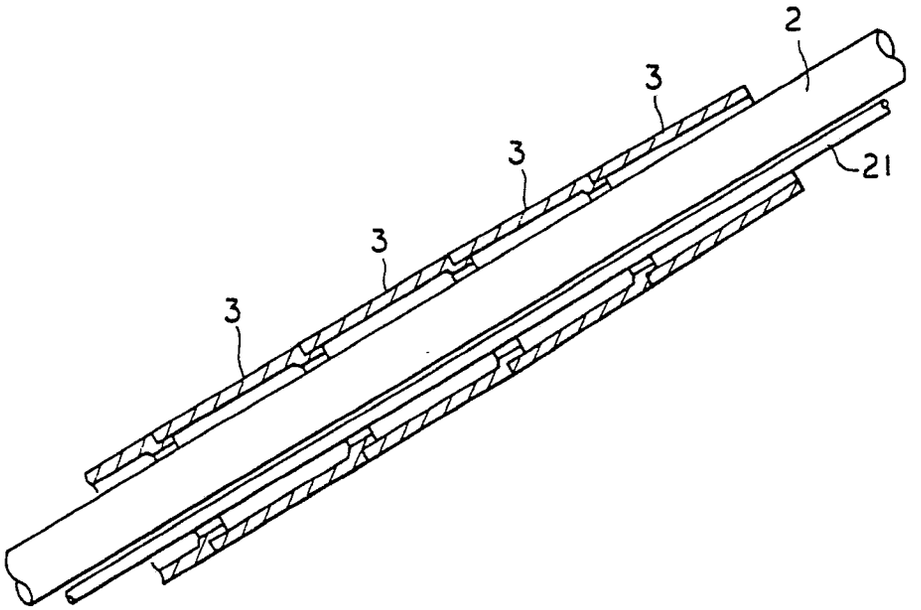

Fig. 5(B)

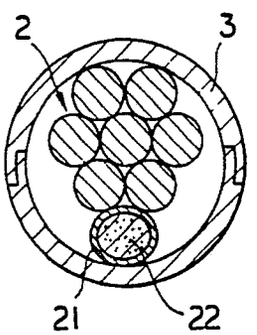

Fig. 5(C)

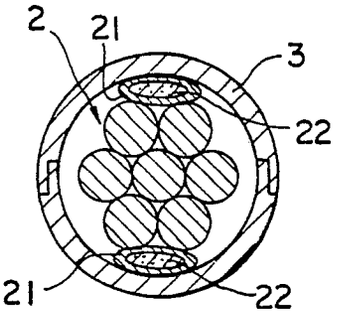

Fig. 6(A)

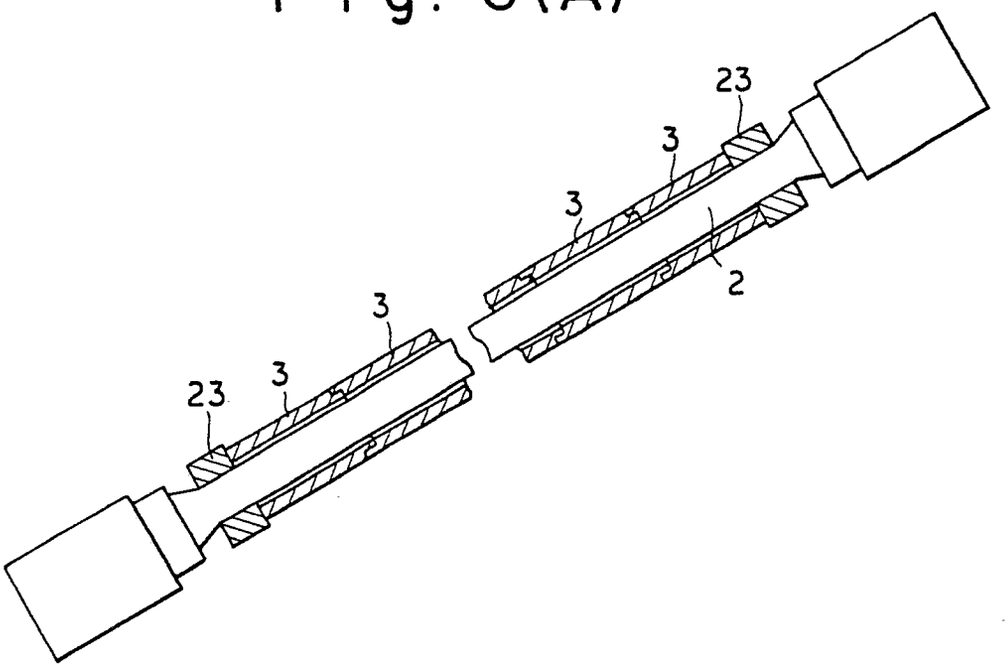

Fig. 6(B)

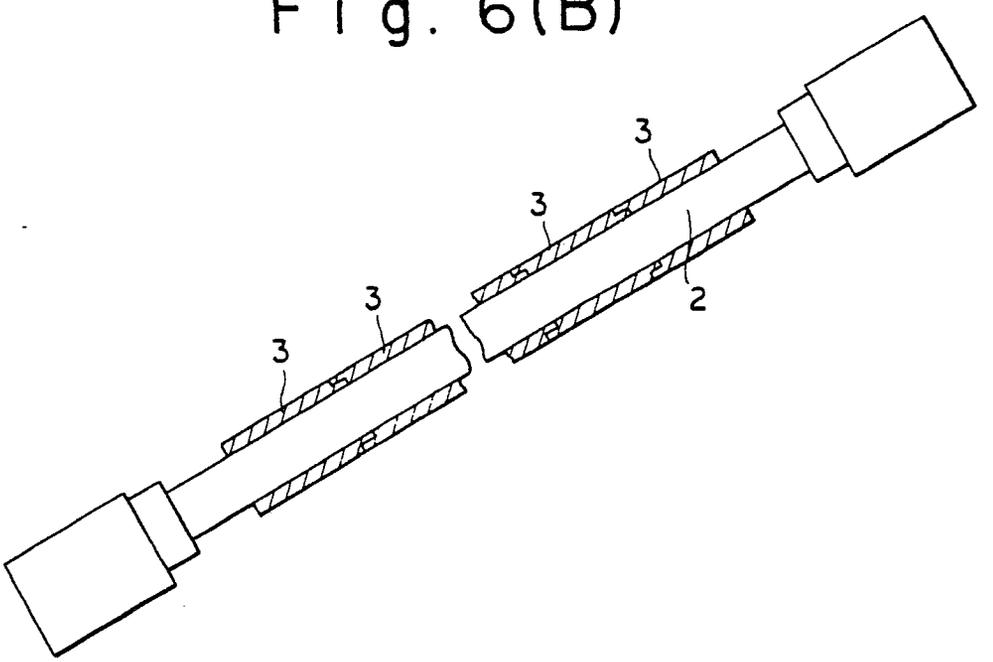

Fig. 7

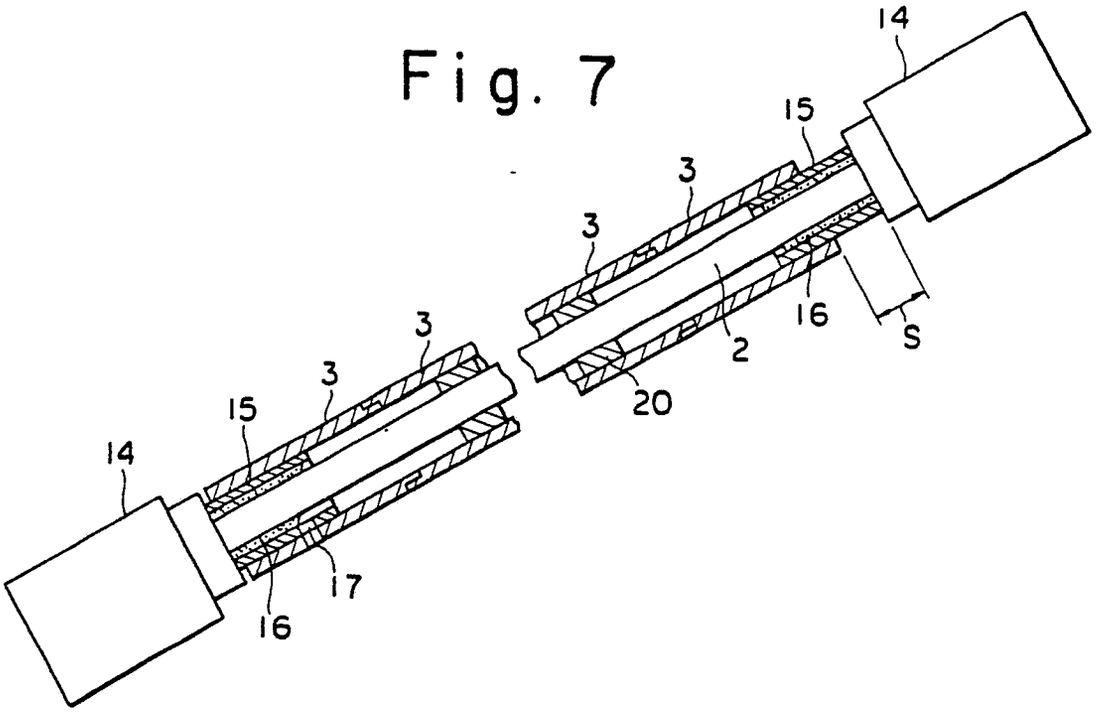

Fig. 8

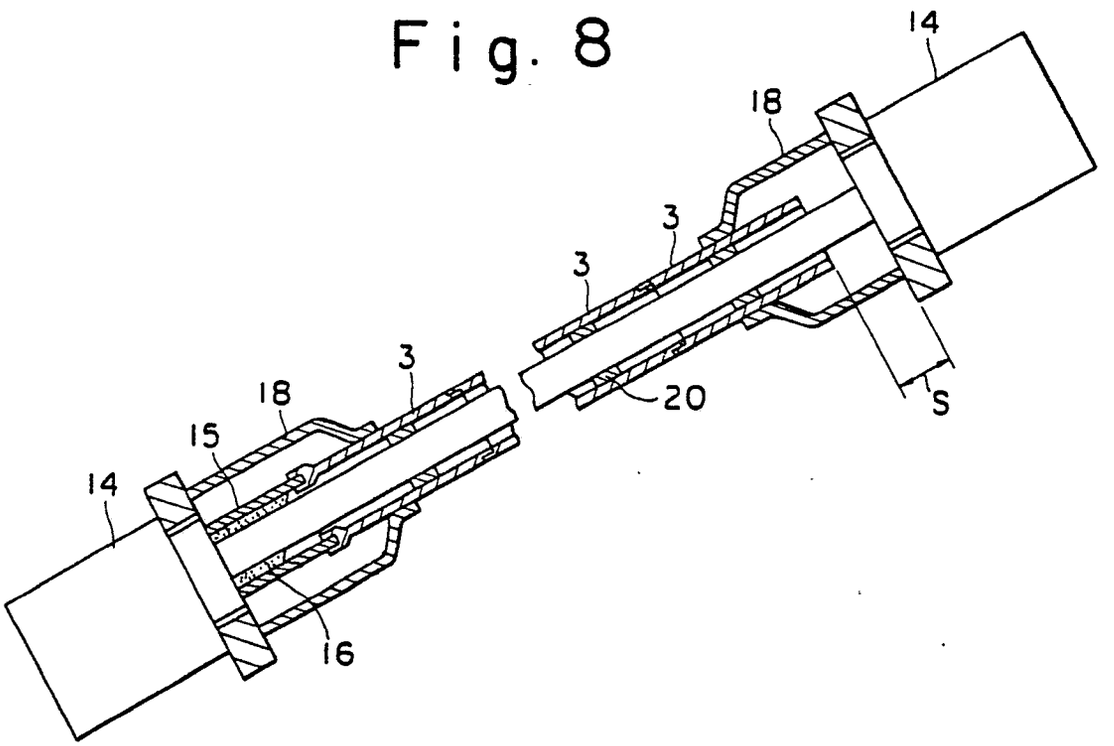

Fig. 9

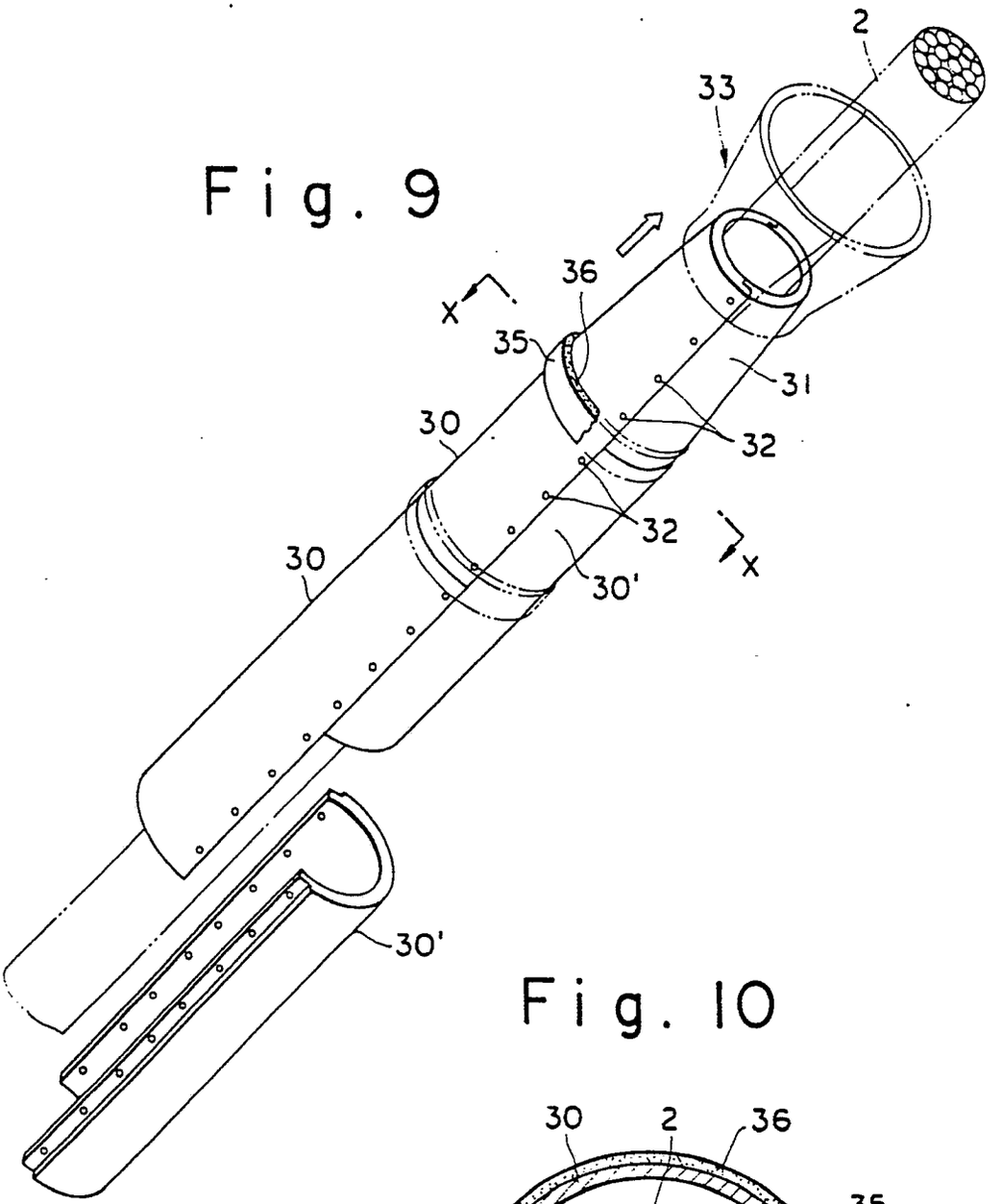

Fig. 10

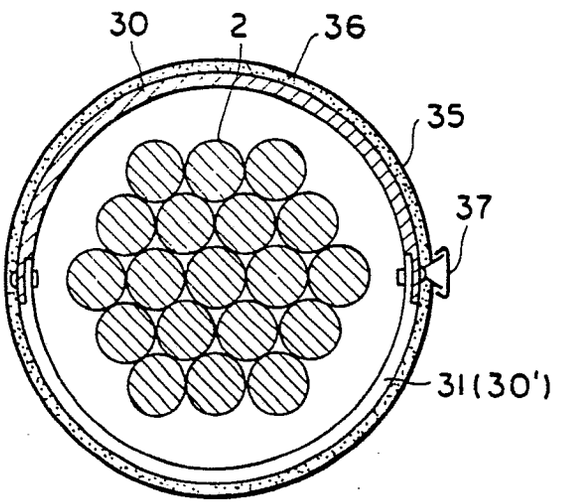

Fig. 11

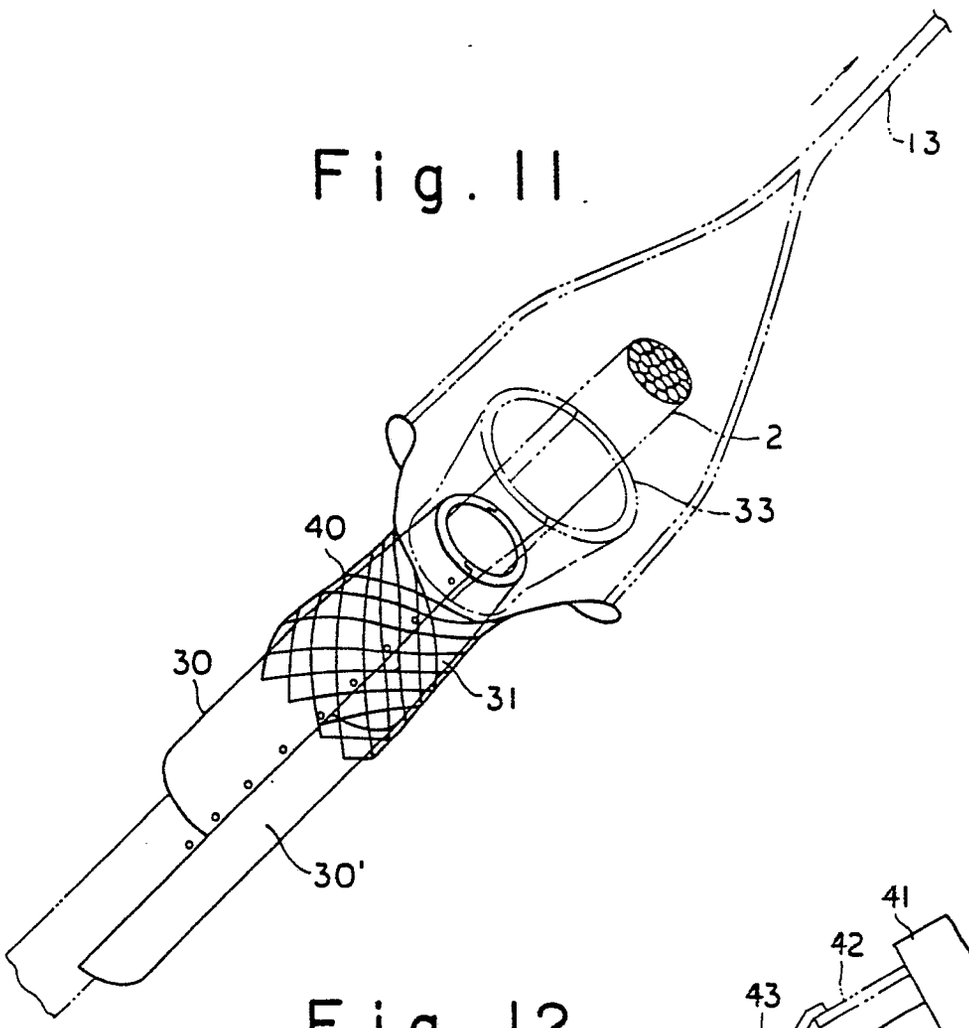

Fig. 12