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Description

TECHNICAL FIELD

[0001] The present invention relates to a road barrier post. In particular, the present invention relates to a post and parts therefor that may be used for, but not limited to, cable barriers. For ease of reference, the present invention will now be described while in use.

BACKGROUND ART

[0002] The present invention is designed to further improve upon the applicants earlier cable barrier post covered by NZ Patent No. 546969.

[0003] The post in NZ 546969 was itself designed to overcome problems with conventional cable barrier posts for a reading network which have a single aperture (slot) extending downwards though the middle of the barrier post as shown in Figure 7. This slot retaining one or more barrier cables within the cable barrier system.

[0004] In short, one of the major drawbacks with this conventional single slot construction is that in order to accommodate multiple cables, the length of the slot is relatively long compared to the length of the post. As a consequence sides of the slot have considerably less strength than the remainder of the post. Accordingly, this necessitates constructing the post in a manner that provides sufficient lateral strength to help prevent shearing or buckling of the post in this weakened region. Thus, typically posts have to have a solid construction, or use stronger materials in their construction, to compensate for the reduction of strength and this understandingly adds to their cost.

[0005] Furthermore, the location of the slot within these barrier posts makes it difficult to replace, one or more posts, that may be damaged or broken, within an erected cable barrier system. The cables have to be loosened within the cable barrier system and/or a large post hole relative to the size of the post may have to be dug to allow room for manoeuvring the new post into position, in order to insert the post into the already erected cable barrier.

[0006] However, whilst the post of NZ 546969 addressed the aforementioned shortcomings with the single slot post, the Applicant has now found that in practice, the post in NZ 546969 also has a number of shortcomings. One such shortcoming is the folding over of the top of the post, following an impact with the barrier. This ends up trapping at least one of the cables within the aperture and thus reduces the energy that can be absorbed if the cables were free to fully flex.

[0007] In addition, it also means the post cannot be reused which is wasteful and expensive.

[0008] It would therefore be useful to have a post which improves upon the post in NZ 546969 as well as addresses the issues with the single slot post discussed earlier.

[0009] SE 529 286 discloses a barrier formed by cables

secured between the upper ends of posts anchored into the ground.

[0010] Throughout this specification, the word "comprise", or variations thereof such as "comprises" or "comprising", will be understood to imply the inclusion of a stated element, integer or step, or group of elements integers or steps, but not the exclusion of any other element, integer or step, or group of elements, integers or steps.

[0011] It is an object of the present invention to address the foregoing problems or at least to provide the public with a useful choice.

[0012] Further aspects and advantages of the present invention will become apparent from the ensuing description which is given by way of example only.

DISCLOSURE OF THE INVENTION

[0013] According to the present invention there is provided a road barrier post as defined in claim 1. The Applicant has found that utilising the same number of apertures on either side of the post allows it to function as a median barrier as it performs in the same manner no matter on what side it is impacted. The post of NZ 546969 by way of contrast can only be used as a roadside barrier. Furthermore, adopting this requirement that the same number of apertures be on either side of the post also ensures the tops of the posts don't fold over following an impact.

[0014] Preferably, the post includes two, four or six apertures on the side of the post.

[0015] According to another aspect of the present invention there is provided a post wherein the apertures do not substantially abut and are instead separated a distance X from the medial axis.

[0016] According to a further aspect of the present invention there is provided a post substantially as described above wherein the post, wherein in use, the post is hollow and includes a cap comprising:

- a top portion; and
- a rim that fits seamlessly over the open-ended top of the post and at least one elongated appendage extends substantially inside the post, wherein the cap and appendage are integrally formed as single piece.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] Further aspects of the present invention will become apparent from the ensuing description which is given by way of example only and with reference to the accompanying drawings in which:

- Figure 1 shows a schematic view of a prior art post
- Figure 2 shows a **prior art** post according to NZ 546969;
- Figure 3 is a photograph which shows a cable barrier

- post impact with posts according to the **prior art**;
- Figure 4** is a photograph of a cable barrier post impact with posts according to the present invention;
- Figure 5** shows a schematic view of a cap and appendage element of unitary construction according to a further element of the present invention;
- Figure 6** shows a schematic view of an embodiment of post according to the present invention; and
- Figure 7** shows a **prior art** single slot post.

BEST MODES FOR CARRYING OUT THE INVENTION

[0018] With respect to Figures 1 and 2 there is provided a post 1 which is hollow and has two apertures 2 and 3 on either side thereof. The apertures 2 and 3 each have an opening 4 and 5 on the side of the post which permits cables (not shown) in use to be inserted or ejected from the apertures 2 and 3. The apertures 2 and 3 also have a retaining portion in the form of a wall 6 and 7 which has a lip 8 and 9 at the top thereof which, in use, assists with retaining a tensioned cable within the apertures 2 and 3.

[0019] Figure 2 differs from Figure 1 in that it has an additional aperture 500 which in use creates an asymmetrical loading on the post when tensioned cables are inserted into the apertures.

[0020] Figure 1 shows a post 1 differs from the prior art post of Figure 2 in that it has the same number of apertures on either side of the post to create a symmetrical loading on the post when tensioned cables are inserted into the apertures. The post 1 in Figure 1 also has a short slot 10 in the top thereof which extends down the middle of the post 1 which is absent in the post 1 Figure 2. The slot 10 extends no more than substantially 10% - 15% of the overall length of the post. This is in contrast some to existing posts prior art posts shown in Figure 7 which have a slot which extends around 30%-40% of the above ground post length as it has to retain all the cables of a cable barrier.

[0021] The post 1 of Figure 1 also differs from the prior art post of Figure 2 in that the apertures 2 and 3 do not abut the median axis Y and are instead separated a distance X therefrom. By way of contrast, Figure 1 the post has a width of 90mm and the distance X, the apertures are separated from the median axis Y, is substantially 5mm.

[0022] In relation to Figure 3 it can be seen how the top of the posts fold over following a vehicle impact with the barrier. This presents a problem as cables get trapped in the apertures if the post folds over reducing the energy that can be absorbed as well as lessening the ability to redirect an errant vehicle.

[0023] The applicant has surprisingly found that if the apertures are moved away from abutting the medial axis of the post this increases as shown in Figure 2 this increases the strength of the post by around 30%. This is

evidenced in Figure 4 where it can be seen that the top of the posts have not folded over at all.

[0024] In relation to Figure 5 there is shown a cap 1000 and appendage element 1001 which has 2 prongs 1002 and 1003. The appendage element is integrally formed with the cap via a moulding process. The advantage of integrally moulding is two fold:

- increased speed of placing the cap, in post, and importantly the prongs are assured to align with opening in the post, for quick insertion in the prior art the prong(s) could move relative to the cap, as they were loosely clicked together;
- ensuring the prongs do not become separated from the cap, if a collision event happens to the barrier, in a region remote from the post associated with the cap, but yet still receives energy from the impact.

[0025] In accordance with the invention, Figure 6 shows a portion of a post 100 having a modified aperture 101. The aperture 101 has a top edge with a quick cable release portion 102 at a distal end thereof which has a steeper angle than the remainder of the top edge 103 which has a shallower angle. The bottom edge 104 of the mouth 101 has a curved surface to also reduce any frictional contact with the cable during an ejection.

DETAILED DISCUSSION OF ALTERNATE WAYS TO IMPLEMENT THE INVENTION

[0026] It should be appreciated that the post may come in a variety of different shapes and configurations and be made from a variety of materials without departing from the scope of the appended claims. In preferred embodiments, the post may be substantially hollow.

[0027] The inventor has found that by using a substantially hollow post, with a simple design requirement of aperture placement, this contributes to the lightweight construction and/or expense of manufacture of the barrier post. Additionally, by selecting a more cost effective material, this can also contribute to the cost of manufacture.

[0028] Preferably, the post may have an elliptical cross-section.

[0029] The aperture(s) may generally come in a variety of different shapes and sizes, provided the apertures have sufficient dimension to receive and retain, and preferably when required, release a segment of the cable.

[0030] The number of apertures on the side of the post must be an even number. That is the same number of apertures needs to be on each side of the post.

[0031] In general, the side apertures may include a retaining portion which retains the cable within the aperture.

[0032] In further preferred embodiments, the retaining portion may include at least one wall portion.

[0033] In some embodiments, the retaining portion may be at least one lip that retains or helps retain the cable within the aperture.

[0034] Preferably, at least one edge of the lip(s) may be curved.

[0035] Preferably, the aperture may project downwards from the mouth of the aperture.

[0036] The opening (mouth) of the aperture may have a variety of different configurations without departing from the scope of the claims. In some embodiments, the mouth may be configured to help direct a cable into the aperture so the cable can be retained therein.

[0037] In further embodiments, the mouth may also be configured to assist the release of the cable from the aperture should a suitable force of sufficient magnitude be applied to the post and/or cable.

[0038] In general, the cable and/or post will only move a sufficient distance to cause release of the cable in the area of the cable-barrier which is directly subjected to a suitable force or the region of the cable-barrier immediately adjacent thereto. Preferably, the force applied to the cable-barrier, may be caused by collision of a vehicle with the cable-barrier or surrounding area. However, it will be appreciated that forces from other areas may be applied to the cable-barrier, without limiting the scope of the present invention. According to the invention, the mouth includes a surface or edge which is inclined at an angle which directs the cable either into or out of the aperture depending on which direction a force is moving the post and/or cable. Preferably, the angle of the top surface or top edge of the mouth may be substantially 45° with respect to the longitudinal axis of the post. The mouth is, for a distal region thereof, configured to reduce:

- the travel path of, and/or;
- any frictional contact with;

[0039] the cable, during ejection from aperture following a collision.

[0040] The mouth may be configured to reduce the travel path and/or frictional contact with the cable during an ejection event in number of different ways.

[0041] In one embodiment the angle of the top surface or edge of the mouth may be substantially 45° at a proximate region thereof, and substantially 50° or more at a distal region thereof, with respect to the horizontal. Preferably, the distal region of the top surface or edge of the mouth may be substantially 60°-70°.

[0042] In some embodiments the bottom surface or bottom edge of the mouth may also be configured to reduce frictional contact with the post as the cable exits the aperture.

[0043] In one embodiment the bottom surface or bottom edge of the mouth may be convexly curved.

[0044] In another embodiment the bottom surface or bottom edge of the mouth may be angled downwardly from the horizontal.

[0045] The inventor has found that the above aperture shape is an advantage. In particular, the shape allows for cables to be easily removed from one or more posts in an already erected cable barrier, without the need for

collapsing the whole barrier. This can be important, for example where the posts may need to be replaced due to damage from an impact. Additionally, the shape of the aperture(s) provides for release of the cables from one or more barrier posts, at a particular point of impact, rather than releasing the cables from all posts, when an impact occurs.

[0046] In preferred embodiments, there may be two elongated appendages that may be situated on opposite sides of the post.

[0047] Preferably, the elongated appendage(s) may fit seamlessly against a portion of the internal surface inside of the post.

[0048] In preferred embodiments, the elongated appendage(s) may effectively close off the opening to the aperture(s).

[0049] Thus, preferred embodiments of the present invention can have a number of advantages which can include:

- posts which have a symmetrical loading when in use;
- posts which have increased lateral strength;
- posts which resist folding over upon an impact into a cable barrier;
- posts which ejects a cable more quickly;
- caps for posts which can be inserted more quickly and easily; and
- caps for posts which can better maintain their integrity during an impact.

[0050] Aspects of the present invention have been described by way of example only and it should be appreciated that modifications and additions may be made thereto without departing from the scope thereof as defined in the appended claims.

Claims

1. A road barrier post (100) which includes apertures (101) on alternate sides of the post which, in use, each receive and retain at least one cable therein wherein the same number of apertures are located on each side of the post wherein each aperture: has a side opening in the form of a mouth, the mouth comprising

- a top surface (102, 103); and
- a curved bottom surface (104); wherein the top surface comprises a distal region extending to the side of the post and forming a quick cable release portion (102) and a proximate region (103) forming the remainder of the top surface

extending away from a median axis (Y) of the post to the distal region, wherein the distal region (102) comprises a steeper angle with respect to the horizontal than the proximate region (103) of the top surface, so as to reduce:

- the travel path of, and/or;
 - any frictional contact with;
- the cable, during ejection from the aperture following a collision by a vehicle.

2. A post as claimed in claim 1 wherein the quick cable release portion (102) formed by the distal region of the top surface of the mouth is substantially at 50° with respect to the horizontal, and the proximate portion (103) is substantially at 45° with respect to the horizontal.

3. A post as claimed in claim 1 or claim 2 wherein the bottom surface (104) of the mouth is configured to reduce frictional contact with the post (100) as the cable exits the aperture.

4. A post as claimed in claim 3 wherein the bottom surface (104) of the mouth is convexly

5. A post as claimed in claim 3 wherein the bottom surface (104) of the mouth is angled downwardly from the horizontal.

6. A post, as claimed in claim 1:

wherein in use, the post (100) is hollow and includes a cap (1000) comprising:

- a top portion; and
- a rim that fits seamlessly over the open-ended top of the post and at least one elongated appendage extends substantially inside the post, wherein the cap and appendage are integrally formed as single piece.

7. A post as claimed in claim 6 wherein the apertures (101) do not substantially abut and are instead separated a distance X from the median axis of the post.

8. A barrier which includes a post (100) as claimed in any one of the preceding claims.

Patentansprüche

1. Straßenbarrierepfosten (100), welcher Öffnungen (101) auf alternierenden Seiten des Pfostens einschließt, welche in Verwendung jeweils mindestens ein Kabel darin aufnehmen und festhalten, wobei auf jeder Seite des Pfostens die gleiche Anzahl an Öffnungen lokalisiert ist, wobei jede Öffnung eine Seitenöffnung in der Form eines Mundes aufweist, wo-

bei das Mund umfasst

- eine obere Oberfläche (102, 103); und
 - eine gekrümmte untere Oberfläche (104);
- wobei die obere Oberfläche eine distale Region, die sich zur Seite des Pfostens hin erstreckt und einen Anteil zum schnellen Freigeben von Kabeln bildet, (102) und eine proximale Region (103), die den Rest der oberen Oberfläche bildet, welcher sich weg von einer Mittelachse (Y) des Pfostens hin zu der distalen Region erstreckt, umfasst, wobei die distale Region (102) einen steileren Winkel bezüglich der Horizontalen als die proximale Region (103) der oberen Oberfläche umfasst, um so zu verringern:
- den zurückzulegenden Weg von und/oder;
 - jedweden Reibungskontakt mit dem Kabel während dem Entfernen aus der Öffnung nach einer Kollision durch ein Fahrzeug.

2. Pfosten wie in Anspruch 1 beansprucht, wobei der Anteil zum schnellen Freigeben von Kabeln (102), der durch die distale Region der oberen Oberfläche des Mundes gebildet wird, im Wesentlichen 50° bezüglich der Horizontalen aufweist und der proximale Anteil (103) im Wesentlichen 45° bezüglich der Horizontalen aufweist.

3. Pfosten wie in Anspruch 1 oder Anspruch 2 beansprucht, wobei die untere Oberfläche (104) des Mundes so konfiguriert ist, dass ein Reibungskontakt mit dem Pfosten (100), wenn das Kabel die Öffnung verlässt, verringert ist.

4. Pfosten wie in Anspruch 3 beansprucht, wobei die untere Oberfläche (104) des Mundes konvex gekrümmt ist.

5. Pfosten wie in Anspruch 3 beansprucht, wobei die untere Oberfläche (104) des Mundes von der Horizontalen nach unten abgewinkelt ist.

6. Pfosten wie in Anspruch 1 beansprucht:

wobei in Verwendung der Pfosten (100) hohl ist und einen Aufsatz (1000) einschließt, umfassend:

- einen oberen Anteil; und
- einen Rand, der übergangslos mit dem offenen oberen Ende des Pfostens zusammenpasst, und wobei sich mindestens ein länglicher Fortsatz im Wesentlichen in den Pfosten erstreckt, wobei der Aufsatz und der Fortsatz integral als ein einziges Stück geformt sind.

7. Pfosten wie in Anspruch 6 beansprucht, wobei die

Öffnungen (101) im Wesentlichen nicht an die Mittelachse des Pfostens grenzen und anstelle dessen einen Abstand X davon aufweisen.

8. Barriere, welche einen Pfosten (100) wie in einem der vorhergehenden Ansprüche beansprucht einschließt.

Revendications

1. Montant (100) de barrière routière qui comprend des ouvertures (101) sur des côtés alternés du montant qui, à l'usage, reçoivent et retiennent chacun au moins un câble à l'intérieur de ces derniers, dans lequel on positionne le même nombre d'ouvertures de chaque côté du montant, dans lequel chaque ouverture a :

une ouverture latérale se présentant sous la forme d'une bouche, la bouche comprenant :

une surface supérieure (102, 103) ; et
une surface inférieure incurvée (104) ;
dans lequel la surface supérieure comprend une région distale s'étendant vers le côté du montant et formant une partie de libération de câble rapide (102) et une région proximale (103) formant le reste de la surface supérieure s'étendant à distance d'un axe médian (Y) du montant jusqu'à la région distale,
dans lequel la région distale (102) comprend un angle plus raide par rapport à l'horizontale que la région proximale (103) de la surface supérieure, afin de réduire :

la trajectoire de déplacement de et/ou tout contact de friction avec :

le câble, pendant l'éjection de l'ouverture suite à une collision par un véhicule.

2. Montant selon la revendication 1, dans lequel la partie de libération de câble rapide (102) formée par la région distale de la surface supérieure de la bouche est sensiblement à 50° par rapport à l'horizontale, et la partie proximale (103) est sensiblement à 45° par rapport à l'horizontale.

3. Montant selon la revendication 1 ou la revendication 2, dans lequel la surface inférieure (104) de la bouche est configurée pour réduire le contact de friction avec le montant (100) lorsque le câble sort de l'ouverture.

4. Montant selon la revendication 3, dans lequel la sur-

face inférieure (104) de la bouche est incurvée de manière convexe.

5. Montant selon la revendication 3, dans lequel la surface inférieure (104) de la bouche est coudée vers le bas à partir de l'horizontale.

6. Montant selon la revendication 1 :

dans lequel, à l'usage, le montant (100) est creux et comprend un capuchon (1000) comprenant :

une partie supérieure ; et
un bord qui est monté, sans soudure, sur la partie supérieure à extrémité ouverte du montant et au moins un appendice allongé s'étend sensiblement à l'intérieur du montant, dans lequel le capuchon et l'appendice sont formés, de manière solidaire, d'un seul tenant.

7. Montant selon la revendication 6, dans lequel les ouvertures (101) ne viennent pas en butée et sont plutôt séparées par une distance X de l'axe médian du montant.

8. Barrière qui comprend un montant (100) selon l'une quelconque des revendications précédentes.

Figure 1

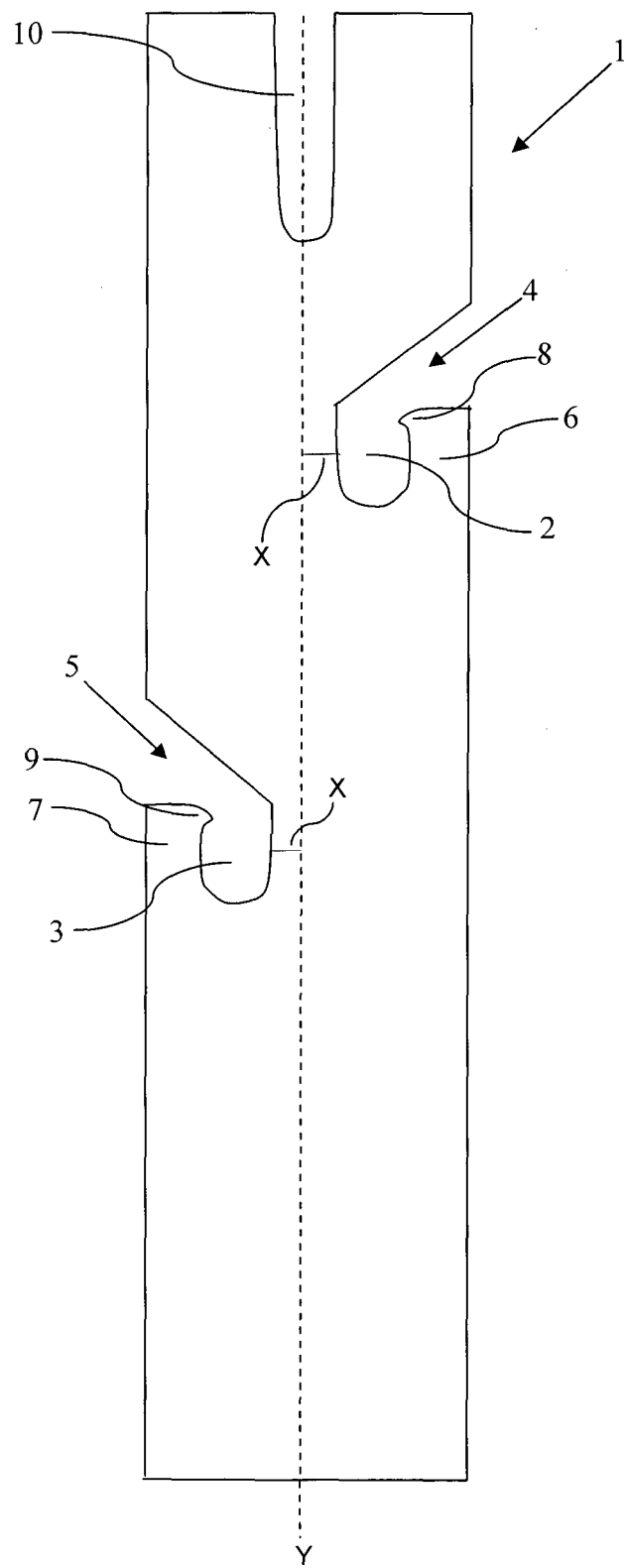


Figure 2

PRIOR ART

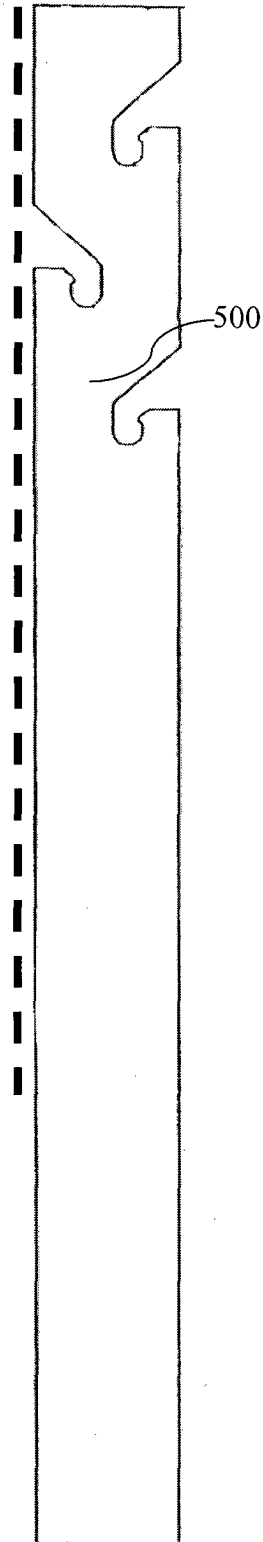


Figure 3

PRIOR ART

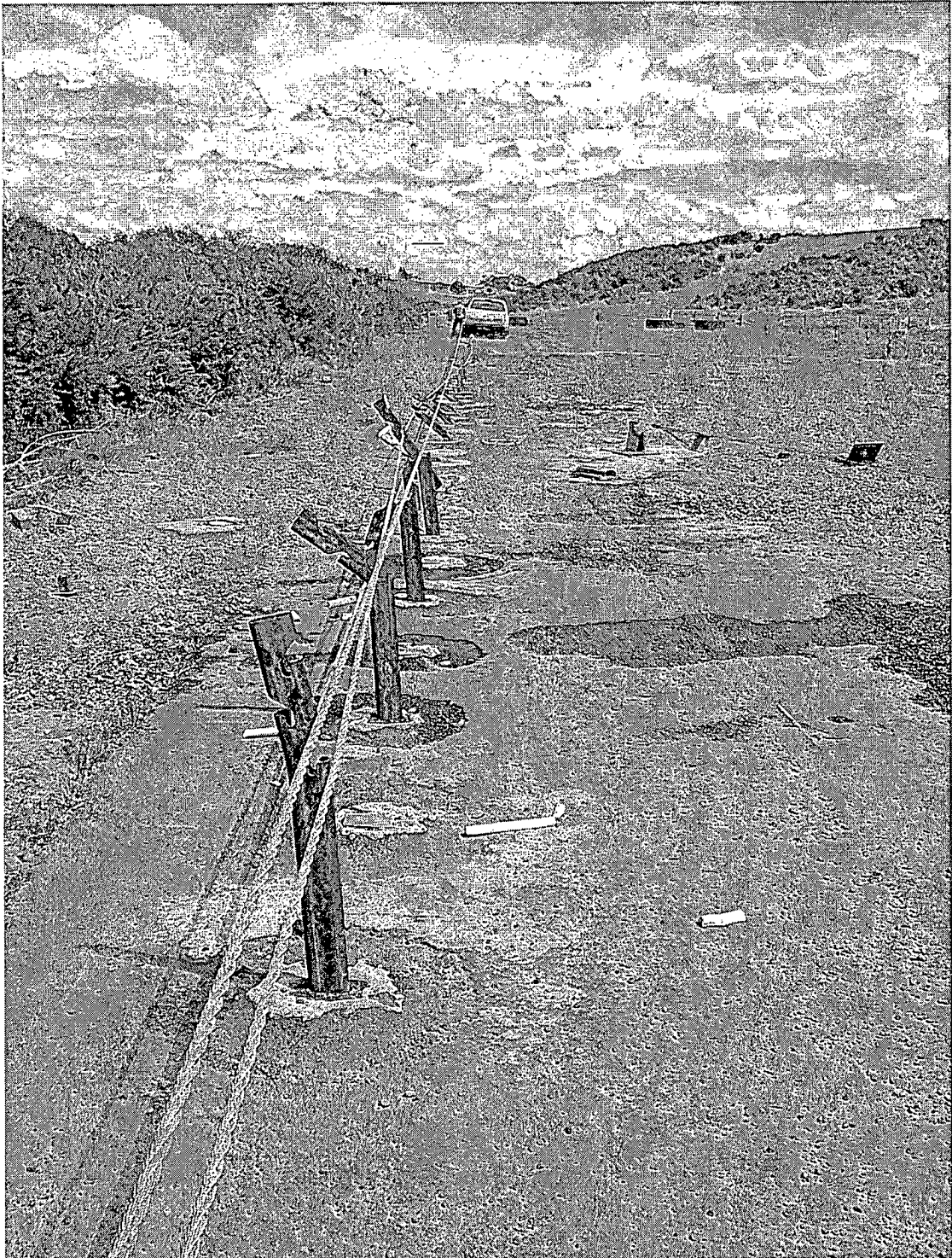


Figure 4

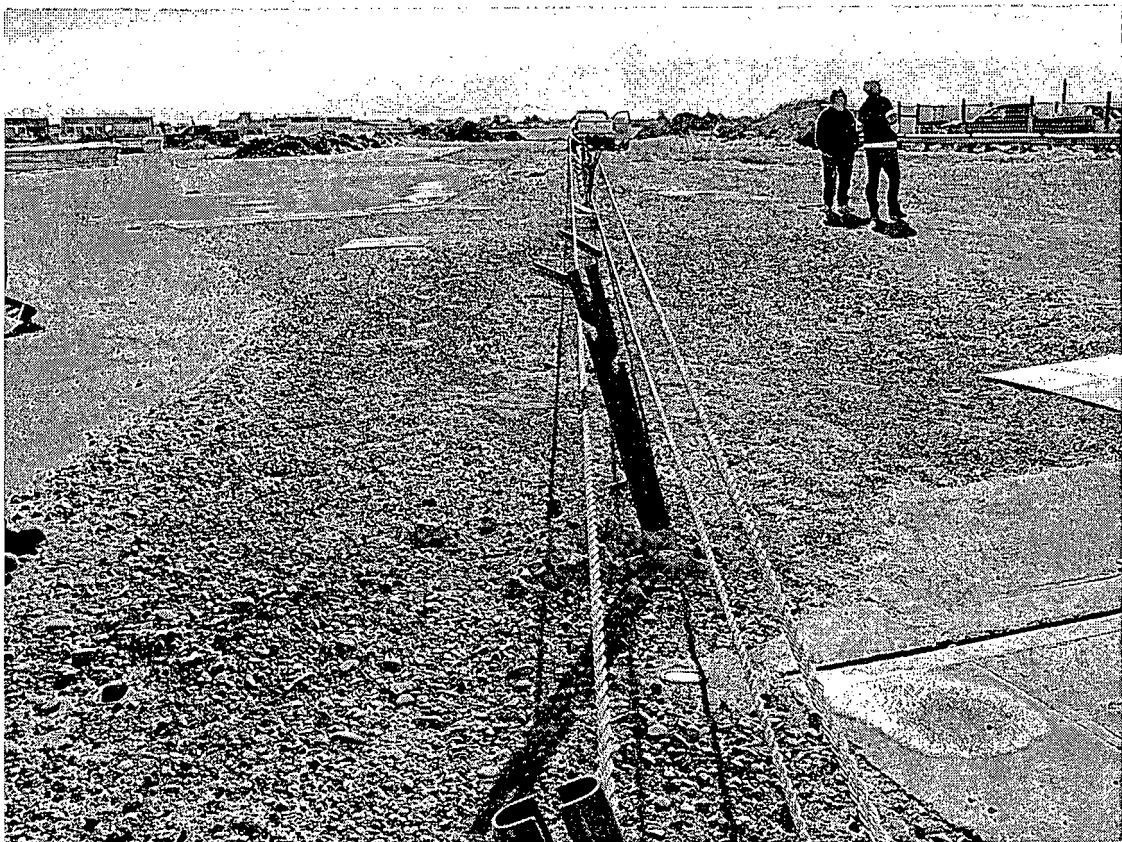


Figure 5

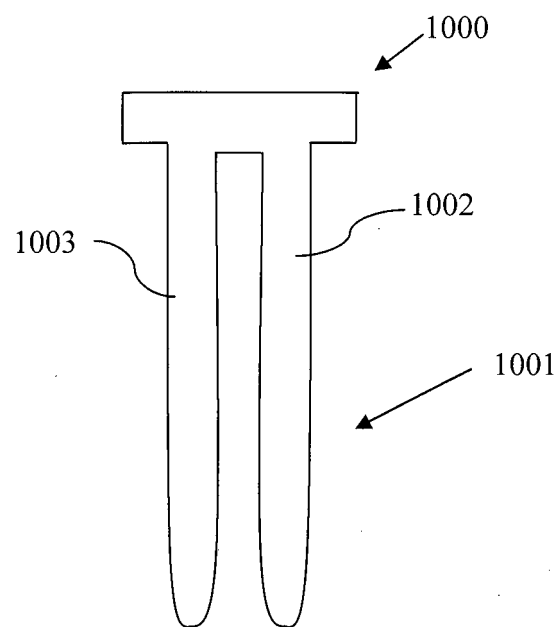


Figure 6

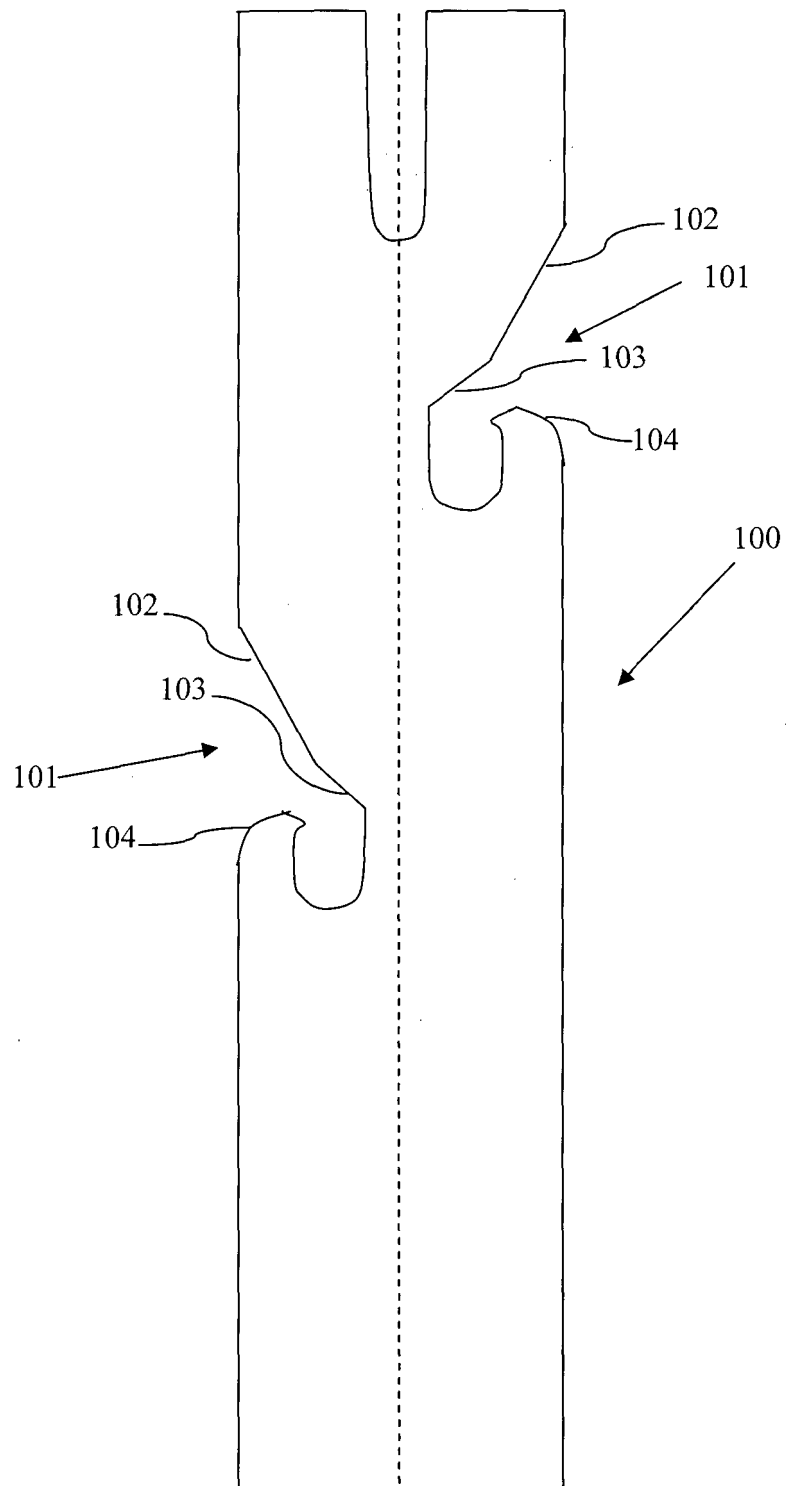
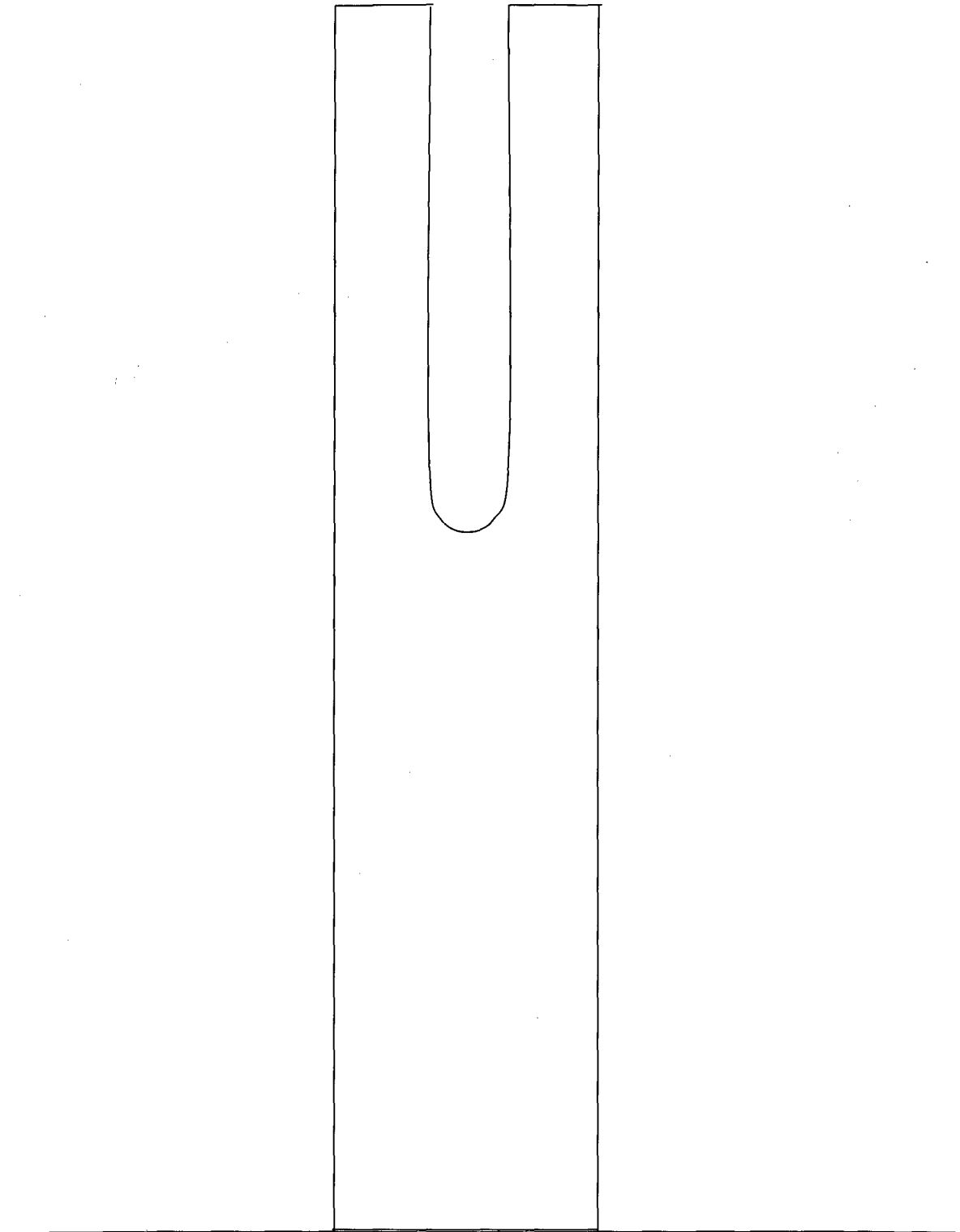


Figure 7

PRIOR ART



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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- SE 529286 [0009]