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DESCRIPTION

Background

[0001] The present invention relates to a shelf for mounting on a substantially rectangular load carrier having four identical columns arranged in the corners thereof, said load carrier comprising columns having a rectangular profile with four side faces, on which shelf at least one holder is mounted that can be inserted into complementary slots in the columns of the load carrier and thereby engage in such a manner that the holder supports on the column, the holder is configured from a rod element which is bent such that it extends from one opening to another opening in the shorter side of the shelf and thus spans out an opening between it and the shelf.

[0002] Load carriers, such as carriages for handling goods, plants, products, etc., are widely used in the retail business, and often they are provided with a set of front wheels and a set of rear wheels mounted on the underside of a bottom frame having vertical columns that extend upwards from the corners of the bottom frame. One or more shelves are arranged for supporting the load charged to the carriage. The shelves are connected to each of the vertical columns by means of holders that can be configured as hooks and are arranged at the corners of the shelves. The holders are configured to engage with slots arranged at suitable intervals in the longitudinal direction of the columns, and the shelves can thereby be mounted or dismounted, moved and/or removed depending on the use situation. That the shelves are removable also means that load carriers take up less space during return transport in empty state. Examples of such shelves are disclosed in patent documents US 3785301 A, US 4457239 A and US 714220 A.

[0003] The work with load carriers often takes place by means of manual operations since maybe the shelves are merely to be moved or else they are mounted manually on the columns of the load carrier. Such manual work entails an inherent risk that the shelves are lost or in other ways impacted by destructive forces.

[0004] It is particularly unfortunate when the shelves are lost in such a way that the face plane of the shelves are, during the fall, oriented vertically since that will often entail that the shelf lands on a holder facing downwards, and hereby there is a high risk of the holder absorbing largely all the energy of motion with ensuing deformation.

[0005] In practice the known construction entails that, at intervals, the shelves need to have one or more holders replaced.

[0006] This is, of course, inconvenient since, on the one hand, the shelves cannot be used during the time it takes to repair the shelf and, on the other, it requires cost-heavy repairs.

Object and brief description of the invention

[0007] It is an object of the invention to provide a shelf whereby the above drawbacks are minimized.

[0008] That is accomplished by a shelf as set forth above which is characterised in that the holder is connected to a shock-absorbing part which is provided with a bend extending in the transverse direction of the shelf, said shock-absorbing part being anchored in the shelf to the effect that forces applied to the holder in a direction extending in the longitudinal direction of the shelf can be absorbed elastically in the bend, and that the shelf comprises four of said holders, wherein the holders are, per pair configured with a shock-absorbing part between them to the effect that the shock-absorbing part provided with bend extends from one of the holders arranged on one side of the shelf to its paired other one of the holders arranged on the other side of the shelf.

[0009] By configuring the holders in this way, it is accomplished that forces which, in the known constructions, entail deformations can now be absorbed elastically in that bend.

[0010] By such configuration of the holders it is accomplished that holders arranged on the one shorter side and on the other shorter side, respectively, can share at least one shock-absorbing element.

[0011] The holders are each separately configured from a rod element that is bent such that it extends from one opening to another opening in the shorter side of the shelf and thereby spans out a rectangle between it and the shelf.

[0012] By configuring the holders such that they span out a rectangle, a high degree of strength is obtained while at the same time the rectangular configuration is easy to manufacture.

[0013] As explained initially, it is often critical when the shelf is caused to hit on a corner. By providing precisely that part of the holder which is closest to the corner with a shock-absorbing part, a higher degree of safety against deformation of the holder is accomplished. It rarely occurs that two holders on the shorter side hit the underlay at the same time; rather it most often occurs in such a manner that a single holder hits first and thereby impacts the part of the rod which is connected to the shock-absorbing part.

[0014] According to a preferred embodiment, the shock-absorbing part is deployed in a recess in the shelf.

[0015] Thereby it is accomplished that the shock-absorbing part sits more securely and also that the part of the shock-absorbing part that transmits forces to the shock absorber as such is secured against deflection, and thereby all of the energy is transferred from the holder to the

shock absorber.

[0016] The shock-absorbing part can also be deployed in a recess in the shelf, wherein the shelf material is, in the area around the recess, mutually adapted to the shock-absorbing part to the effect that an impact on the shock-absorbing part is capable of deforming the shelf material in the area around the bend of the shock-absorbing part. By configuring the shelf in this way, very simple manufacture is accomplished since the shelf need not be configured with a recess allowing movement of the shock-absorbing part - as it is, that recess may be generated in use.

[0017] According to a preferred embodiment, the shelf is made of plastics.

Brief description of the drawing

[0018] In the following, embodiments of the invention will be described with reference to the accompanying figures. It is to be stressed that the embodiments shown are exemplary, and that the invention is not limited thereto, wherein

Figure 1 is a side view of the top face of a shelf;

Figure 2 shows the bottom face of a shelf;

Figure 3 shows an embodiment of a shock absorber shown in section B, figure 2, in enlarged view;

Figure 4 shows an embodiment of a shock absorber shown in section B, figure 2, in enlarged view;

Figure 5 shows an embodiment of a holder shown in section A, figure 2, in enlarged view;

Figure 6 shows a section of a shelf, where the shock-absorbing part is deployed in a recess in the shelf;

Figure 7 shows how a shock-absorbing part can be retained in a shelf.

Detailed description

[0019] With starting point in the shown figures, an embodiment of the invention will be explained in further detail.

[0020] Figure 1 shows a shelf 1 according to the invention. In the shown embodiment, the shelf is configured with recesses 2, 2' that can serve as handles.

[0021] The shelf is configured as a rectangle, and moreover it is configured with four identical holders 3, 3′, 3", 3‴ arranged on the shorter sides of the shelf. They are intended to engage with complementary slots in four columns (not shown).

[0022] In figure 2, the underside of the same shelf is shown, and there it will appear that, in the shown embodiment, the four holders are configured as a bent rod element that spans out a rectangle 4 between it and the shelf.

[0023] As will appear from the top of figure 2, the holder to the right-hand side 3' is, via a rod element 5, connected to the holder 3‴ to the left-hand side. As will also appear from figure 2, this rod element extends with a bend 6. That is shown in enlarged view in figure 4.

[0024] Turning now to figure 4, the function of that bend will be explained in further detail. As will appear here, that bend is located in a recess 7, 7' that allows an axial and springy movement of the rod element 5, where the spring force comes from a momentum in the bend 6.

[0025] Such spring effect is of consequence to the longevity of shelves, since impact of a force on a holder is capable of transplanting axially through the rod 5 to the bend 6. By configuring rod and bend from a material that allows elastic deformation as explained in the paragraph above, it is thus possible to achieve that forces normally acting to deform a holder can be received elastically.

[0026] Thereby expensive repairs of a shelf can be prevented.

[0027] In the embodiment shown in figure 2, the shelf is not just configured such as to be symmetrical about the longitudinally extending symmetry line C thereof; rather it is also configured such that it is constructed symmetrically about the symmetry line C' extending in the shorter direction. Those symmetries are, for the sake of manufacture, advantageous, especially since the holders 3, 3' to the right-hand side of the shelf (seen in the figure) are thus caused to share the springy bends 6,6' (shown at the top and at the bottom of the figure) with the holders 3", 3‴ to the left-hand side of the shelf. Albeit advantageous, that symmetrical construction is neither completely nor partially necessary for the invention.

[0028] From the same figure it will appear that the four holders 3, 3′, 3", and 3‴ can be configured alike, and, as will appear in the top right-hand corner of figure 2, the holders are, in the shown embodiment, configured with two parts that extend into a shorter side on the shelf, viz a part 8 that extends into the shelf at the longer side of the shelf. That part is a direct part of the shock-absorbing element of the shelf, it being an extension of the rod element 5.

[0029] The second part 9 of the holder extends into the shelf, closer to the longitudinally extending line of symmetry C of the shelf. That part 9 is, in the embodiment shown, configured with a bend and a part 10 in extension thereof which does not extend in parallel with the longer

side of the shelf. The object of that bend and extension is to ensure good hold of the holder in the shelf.

[0030] The springy part (bend) 6 may, like in the shown embodiment, be configured such that it is connected to that part of the holder which extends into the shelf closest to that longer side 11. This is advantageous, it being thereby possible to obtain a higher degree of safety against deformation of the holder since, as explained above, a shelf that is lost will most often land on a corner, and precisely by connecting that part of the holder which is closest to the corner to the shock-absorbing part 5, it will be ensured that the most often occurring impacts can be absorbed in the shock-absorbing part.

[0031] However, one could also configure the shelf with a shock-absorbing part which is connected to that part of a holder which extends into the shelf farthest away from the longer side 11 thereof, and, of course, one could also imagine an embodiment in which the shelf is configured with one or more holders as shown in the figures, where both parts of the one or more holder(s) are configured with a connection for a shock-absorbing part.

[0032] Figure 3 shows a bend 6 that does not extend in a recess/recessing 7 as shown in figure 4. Such an embodiment lends itself for use in particular in case of shelves where the shelf material as such is of such nature that the recess/recessing is created by an impact on the rod 5 which may arise during normal use, viz. when, when falling, the shelf lands on a holder. By configuring shelf holder and shock absorber in this way, very simple manufacture is obtained.

[0033] Figure 6 shows, in enlarged view, how a shelf can be configured with a rod part 5 that connects a holder (not shown) to a shock-absorbing part that extends in a bend 6 which is deployed in a recess 7, 7'. That recess allows that the upper parts (in the figure) of the bend can be moved freely during elastic deformation.

[0034] In figure 6 it is also shown how rod element 5 with bend 6 can be retained in a recess configured in a shelf of plastics. Here, rod element 5 and bend 6 extend in entirety in a recess in the shelf. By configuring the shelf in that way, it is possible to obtain advantageous securing of the rod element and bend, as they can be retained merely by melting a portion of plastics material on both sides of the rod element (also where it extends in the bend 6). Thereby deflection of the rod material is prevented (at right angles to the face plane of the shelf), since all pressure forces are conveyed to the bend 6.

[0035] The melting as such may be configured as shown by reference numeral 20 in figure 7. Preferably, the melting takes place in one or more places at the rod element 5 and such that the rod element can be caused to travel axially in the "tunnel" obtained by the melting.

[0036] By securing rod element with bend as explained above, improved options for maintenance are obtained, since, if holder with rod element and bend are to be replaced, it may occur by the following actions: rupturing the melted places; removing rod element and

bend, inserting a new rod with bend; melting material to both sides of the rod at the straight parts thereof and/or melting of material around the rod in its bend.

[0037] According to an embodiment of the method described above, the rupturing of the melted places takes place by one forcing - during removal - rod element with bend through them.

[0038] Preferably the melting around a new rod occurs in places that have not previously been melted.

[0039] In the shown exemplary embodiments, the shock-absorbing part of the shelf are constructed as a rod that comprises a bend that preferably extends in plane-parallel with the face plane of the shelf; but, of course, the shock-absorbing part may also be constructed in ways where the bend does not necessarily extend in that way, including with a bend that extends like a helical spring.

[0040] Moreover, the shock absorber is shown in the figures as sitting between two holders that span out an area.

[0041] The construction with a bend, however, also presents advantages as to strength as explained in the following with reference to figure 6 in particular, from where it will appear that the two legs of the bend each has its abutment face 30 and 30' against the shelf material.

[0042] As it is, the construction with the bend and those abutment faces serves two purposes that both contribute to the longevity of the shelf; the one purpose of the bend being, as explained above, to prevent damage to the holders if for example the shelf is dropped.

[0043] The second purpose is obtained by means of holders connected to rod material with a bend 6 having abutments 30 and 30' against the material of the shelf, like the legs on the bend 6. This is due to the fact that, when the shelf is mounted in the columns and a load is applied to the shelf, a pull will occur in the rod material 5 from the holders 3 to the bend 6, and that pull will transplant and become absorbed in the abutment faces of the legs against the material of the shelf. That configuration is thus a strength-enhancing measure, the rod material 5 with bend 6 reinforcing the shelf to the effect that, while loaded, deflections can be reduced.

REFERENCES CITED IN THE DESCRIPTION

Cited references

This list of references cited by the applicant is for the reader's convenience only. It does not

form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US3785301A [0002]
- US4457239A [0002]
- US714220A [0002]

Patentkrav

1. Hylde (1) til montering på en i det væsentlige rektangulær lastbærer med fire identiske søjler, der er anbragt i hjørnerne deraf, hvilken lastbærer omfatter søjler med en rektangulær profil med fire sideflader, på hvilken hylde mindst én holder (3, 3', 3'', 3‴) er monteret og kan indsættes i komplementære slidser i lastbærerens søjler og derved gå i indgreb på en sådan måde, at holderen støtter på søjlen, hvor holderen er konfigureret af et stangelement (5), som er bøjet (6), således at det strækker sig fra en åbning til en anden åbning i den korteste side af reolen og således spænder over en åbning mellem den og hylden,
kendetegnet ved, at holderen (3, 3', 3'', 3‴) er forbundet med en stødabsorberende del (5), der er forsynet med en bøjning (6), der strækker sig i hyldens tværgående retning, hvilken stødabsorberende del er forankret i hylden, således at kræfter, der påføres holderen i en retning, som strækker sig i hyldens længderetning, kan absorberes elastisk i bøjningen,
og ved, at hylden omfatter fire af de nævnte holdere, hvor holderne per par er konfigureret med en stødabsorberende del (5, 6) imellem sig, således at den stødabsorberende del (5), der er forsynet med en bøjning (6), strækker sig fra en af holderne, der er anbragt på den ene side af hylden, til den parrede anden af holderne, der er anbragt på den anden side af hylden.

2. Hylde ifølge krav 1, **kendetegnet ved, at** enhver af holderne spænder et rektangel ud mellem sig selv og hylden.

3. Hylde ifølge krav 1 eller krav 2, **kendetegnet ved, at** hylden omfatter par af holdere med en stødabsorberende del, der er anbragt i en udsparing i hyldematerialet.

4. Hylde ifølge krav 3, **kendetegnet ved, at** den stødabsorberende del er anbragt i en udsparing i hylden, hvor hyldematerialet i området omkring bøjningen fjernes i forlængelse af de lige dele af den stødabsorberende del og muliggør således en elastisk deformation deraf i området omkring bøjningen.

5. Hylde ifølge et af kravene 1-4, **kendetegnet ved, at** hylden er fremstillet af plast.

DRAWINGS

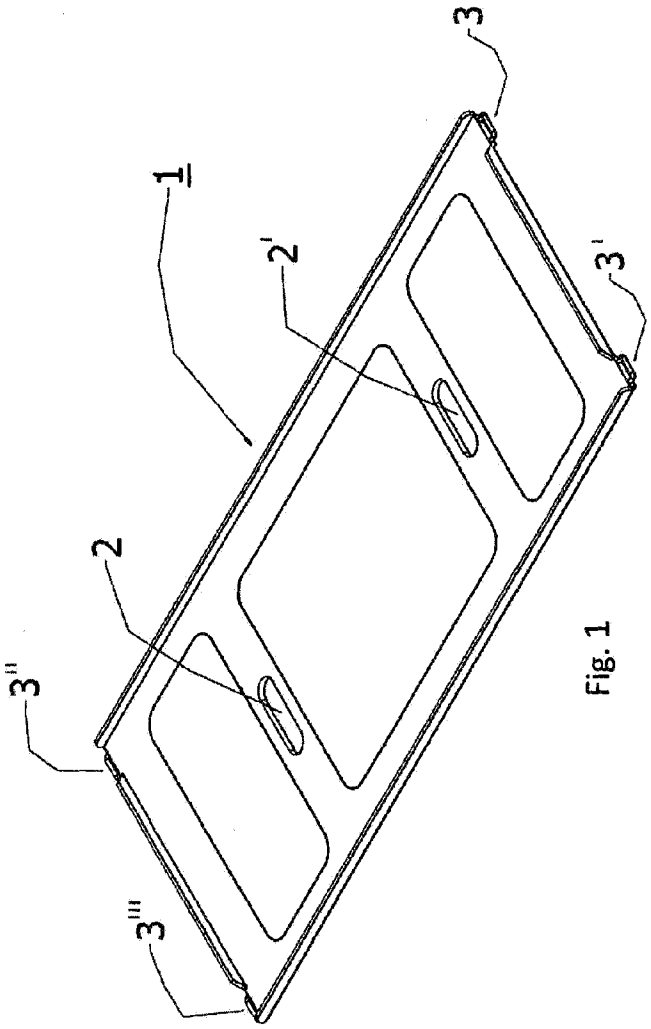

Fig. 1

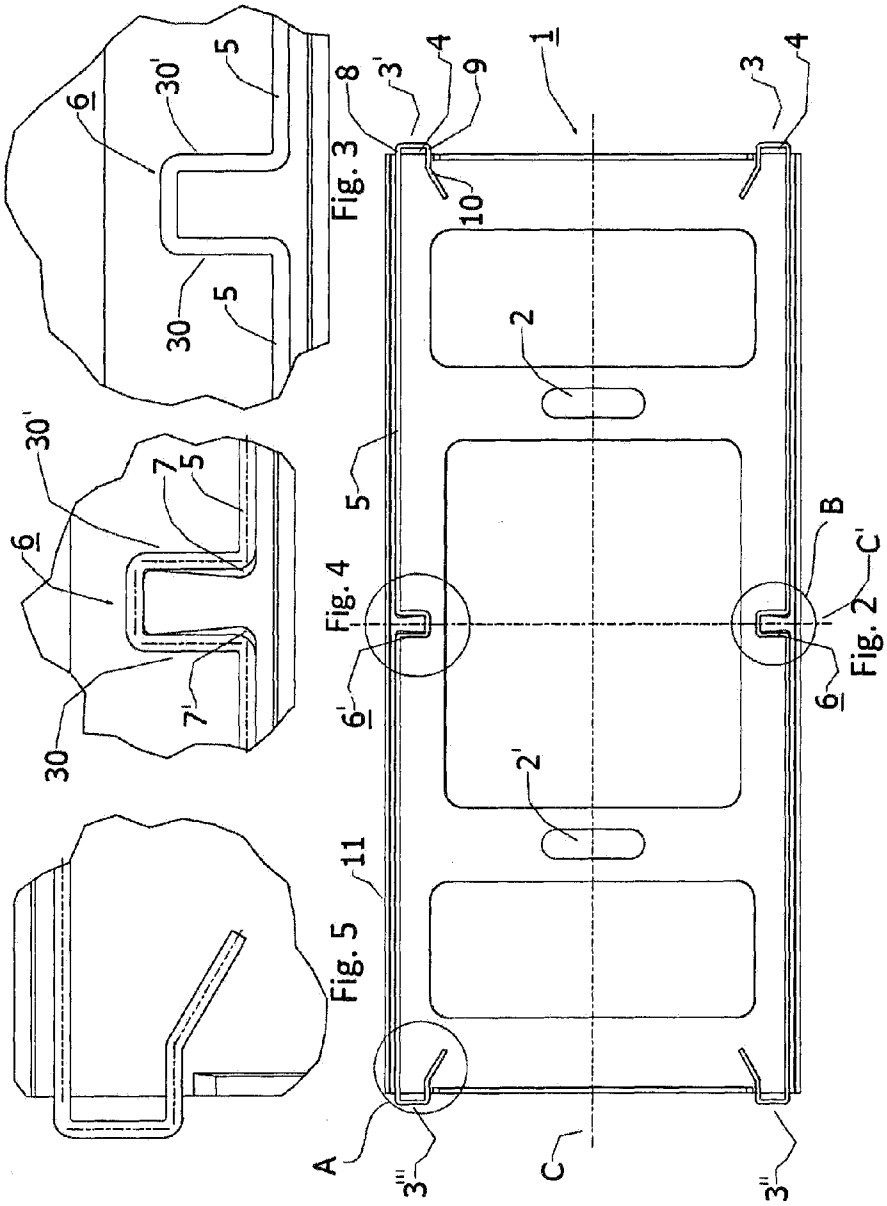

Fig. 2

Fig. 3

Fig. 4

Fig. 5

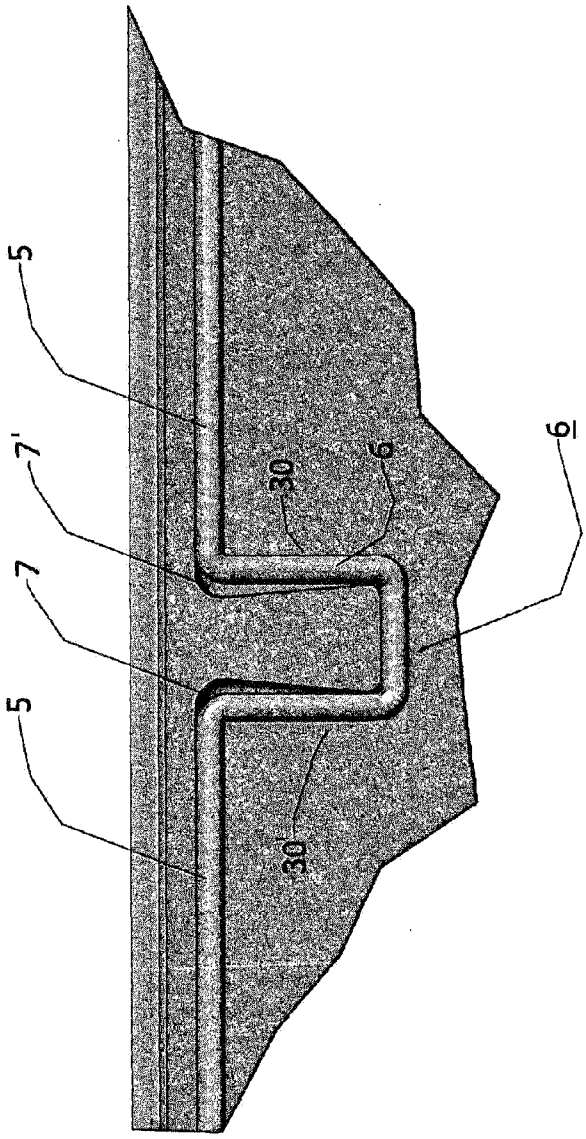

Fig. 6

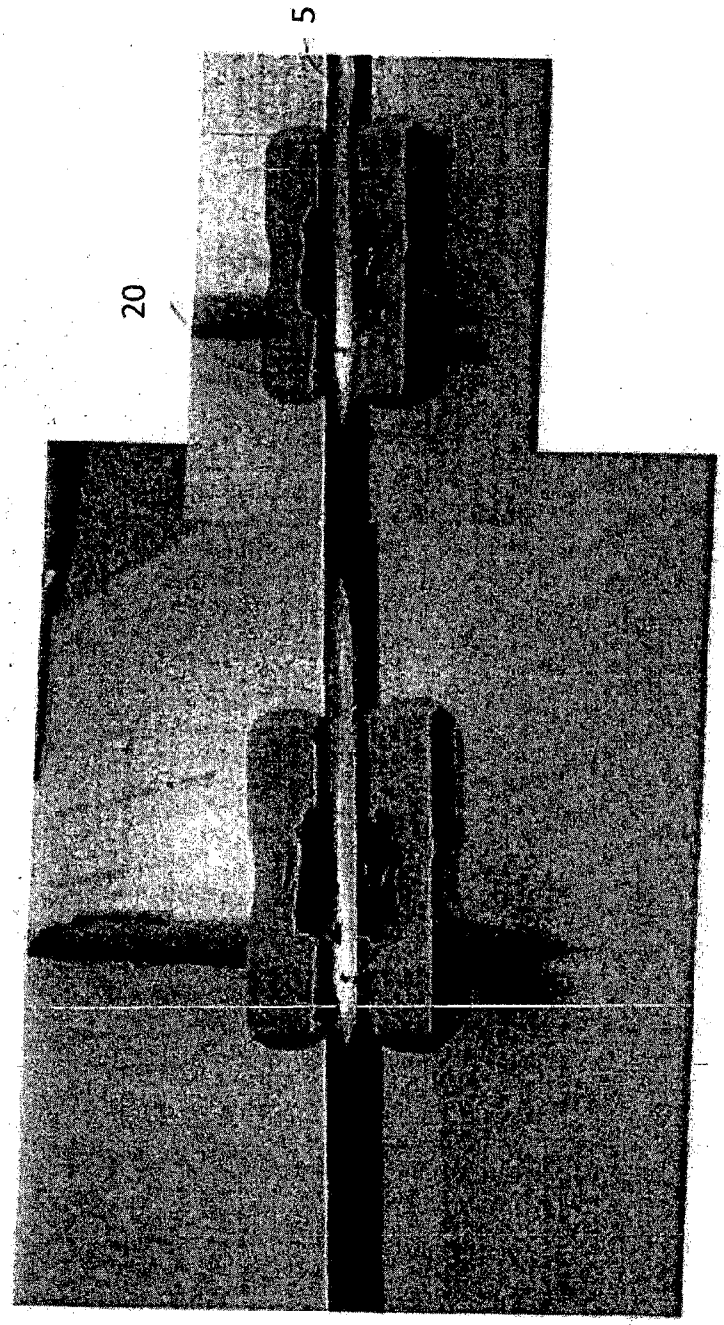

Fig.7