

Aug. 18, 1959

H. STOLLENWERK

2,899,693

STRETCHER

Filed Oct. 15, 1956

5 Sheets-Sheet 1

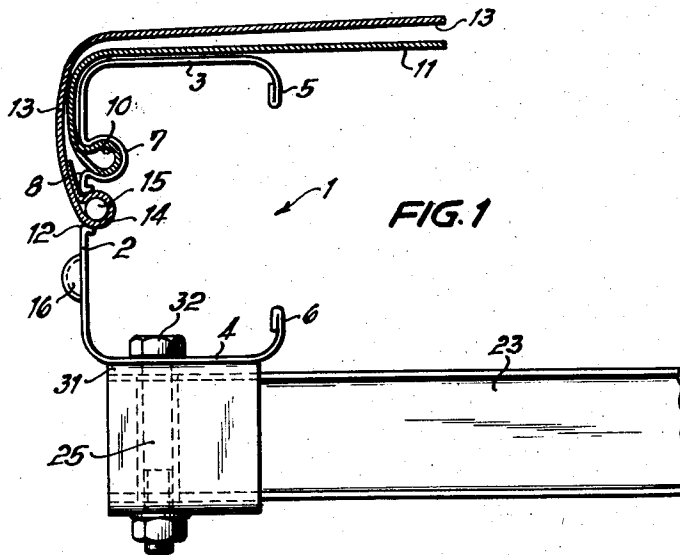


FIG. 1

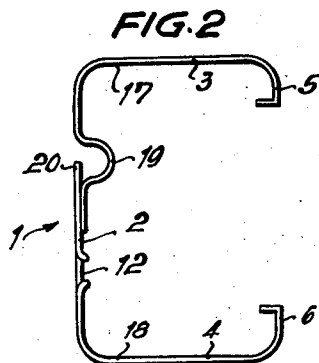


FIG. 2

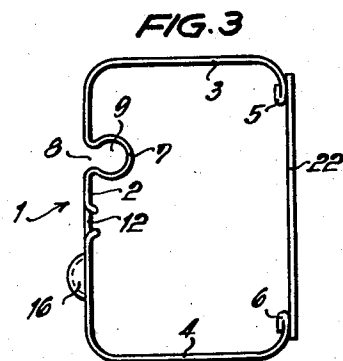


FIG. 3

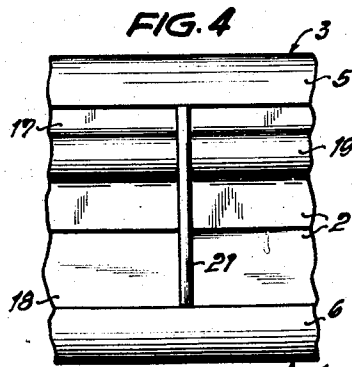


FIG. 4

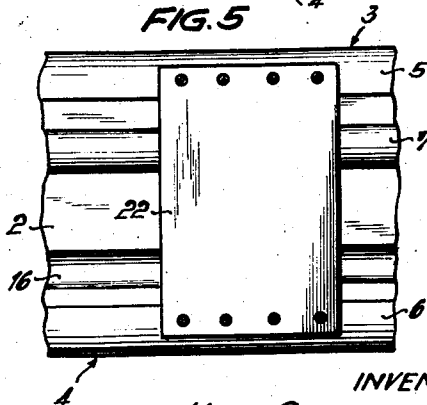


FIG. 5

INVENTOR
HANS STOLLENWERK
BY

W. H. H. H. H.

Aug. 18, 1959

H. STOLLENWERK

2,899,693

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FIG. 6a

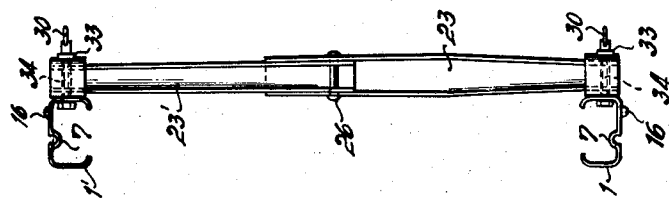
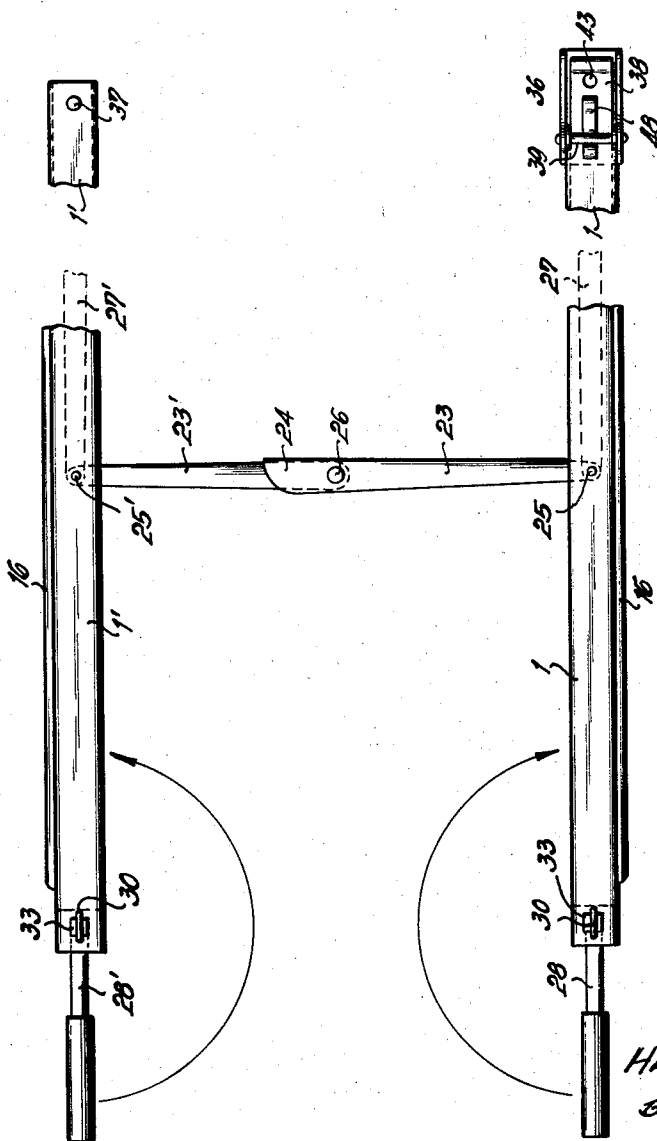


FIG. 6



INVENTOR
HANS STOLLENWERK
BY

Wiese & Hiley

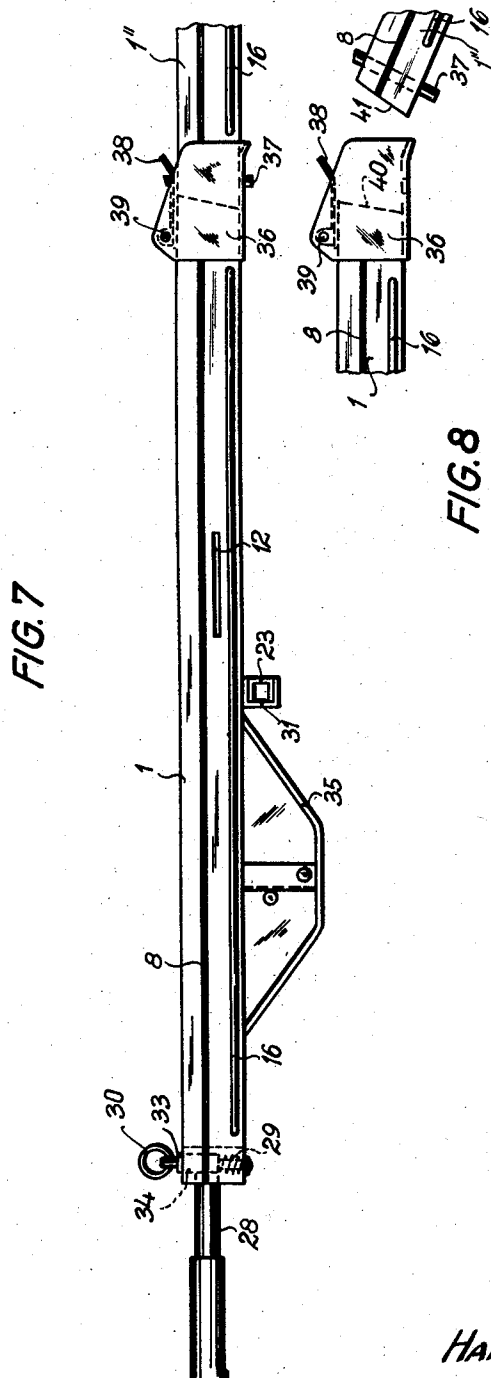
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H. STOLLENWERK
STRETCHER

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INVENTOR
HANS STOLLENWERK
By

Miric & Huiley

Aug. 18, 1959

H. STOLLENWERK

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STRETCHER

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FIG. 10

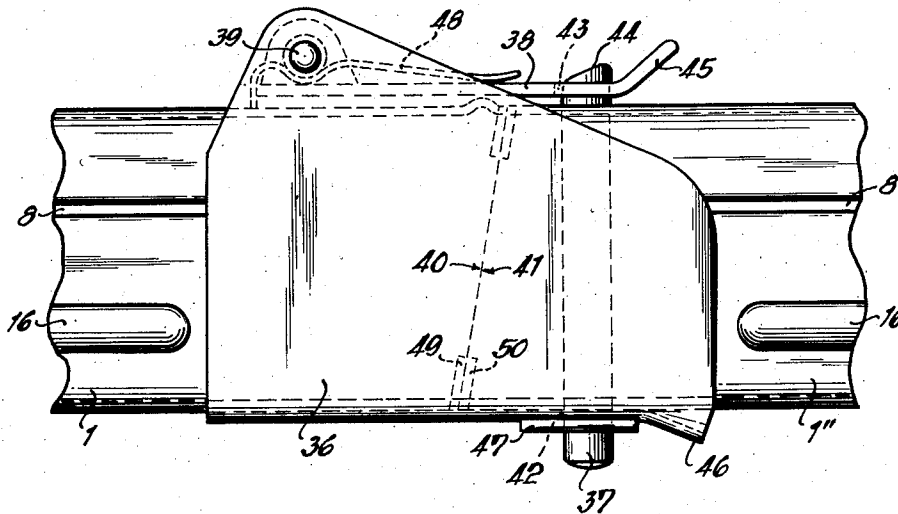
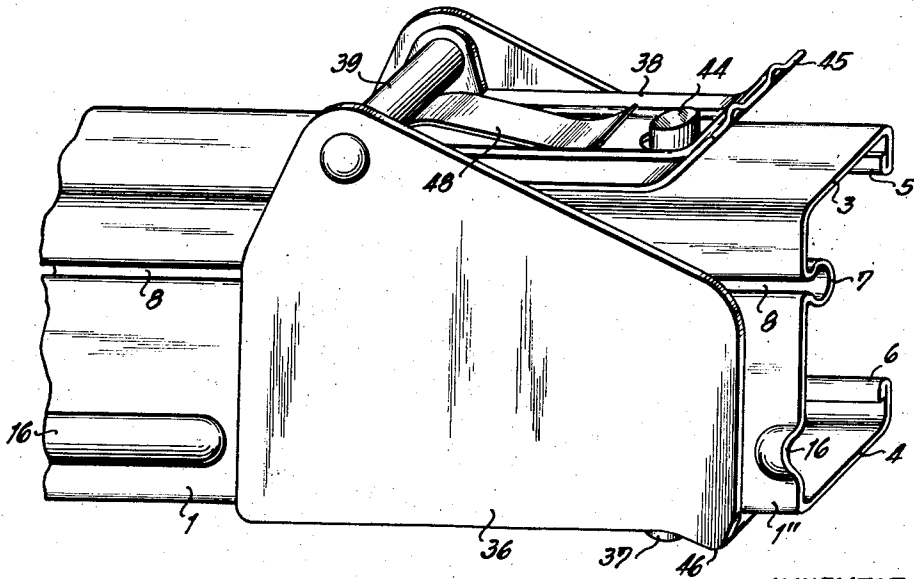


FIG. 11



INVENTOR

HANS STOLLENWERK

BY

Meier & Shiley

1

2,899,693

STRETCHER

Hans Stollenwerk, Köln-Dellbrück, Germany

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2 Claims. (Cl. 5—82)

The invention relates to a stretcher the longitudinal bars of which preferably are subdivided, so that it may be taken apart and folded together by pivotal joints between its longitudinal bars.

Such stretchers should be light weight. Besides that, all parts should be accessible from outside and should be easily cleaned. Furthermore, it should be possible to put the two parts of the stretcher and their joints together when the stretcher is lying on the ground, without lifting the separate parts from the ground and without separate parts which could easily be lost.

The light weight and the easy accessibility of all parts and surfaces so that they can be cleaned, is achieved according to the invention by bars that are made from a material having a C-shaped cross section. Each bar is provided with a depression extending longitudinally of the web of the profile material and into the interior of the profile and the depression has a greater diameter within its interior than at its opening located in the surface of the web.

This depression is utilized to attach the cover of the stretcher which for this purpose is provided with a bead along its edges. This bead is pushed from the end of the profile into this depression in such manner that the cover extends out of the opening. An advantage of this construction is that the side faces of the longitudinal bars have no special projecting points which would disturb the transportation of the stretcher e.g. as when traveling through jungle.

The C-shaped cross section or C-profile and the depression may be made integrally from strip material by rolling or chamfering.

To avoid difficulties during manufacturing which may arise because the diameter of the interior of the depression is greater than the width of the opening of the depression, the C-profile may be made from two angle strips which are secured together parallel to the axis of the profile. One of the strips has a depression in its web surfaces, the opening of which is equal to or greater than the diameter of the interior thereof. The other angle strip partly covers the opening of the depression with the edge of one leg. The manufacture of such profile parts and of such depression is simple and can be easily formed in a bulldozer or chamfering press.

In the face of the web of the C-profile, slots are provided to secure the carrying belts to the bars. The slots correspond in length to the width of the belts. The belts, the ends of which are provided with small loops, are pushed from outside through the slots and are secured in by pins which are pushed into the loops whereby the ends of the belts form a bead.

In the face of the web of the C-profile, beads may be made extending in the longitudinal direction and which are preferably pressed outwards. Besides reinforcing the web of the profile the outmost lateral border of the stretcher is formed by the projecting surface of the bead and not by the cover and the belts, so that the transpor-

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tation of the stretcher is not interfered with when it contacts any object along its side.

The C-profile used according to the invention has almost the same bending strength as a closed hollow profile. Its torsion bending strength, however, is less than that of a closed whole profile. To do away with that disadvantage the C-profile may be further reinforced within its interior and normal to its axis webs, by strip material welded thereto. Alternatively, the ends of the flanges of the C-profile may be interconnected by webs or strip material located parallel to its axis, preferably at those points where the highest torsion moment appears. This has the effect of making the interior of the bars readily accessible for cleaning.

The application of C-profiles for the bars also makes it possible to arrange the handles for the stretcher in the same plane as the bars, and they may be folded back into the interior of the bars where they are out of way.

When using such profiles for subdivided bars a problem arises of finding an easily detachable connection for the parts of the bars, which does not transfer excessive loads to the ends to be joined. When using the open C-profile according to the invention a substantial pressure exerted by the connecting elements normal to the axis of the profile onto the surfaces of the profile must be avoided.

Further, according to the invention such connecting means are used that the pull and push forces at the connection resulting from the bending forces of the bars, merely act in a direction parallel to the axis of the bar on the C-profile. Such connection preferably is obtained by the parts of the bars which are connected with each other by means of a screw bolt secured adjacent to the front face of the one bar part and located in the bending plane, that is where the stresses of use would most likely cause the bar to bend, preferably normal to the axis of the bar. The end of the bolt projecting downwards into a corresponding aperture of a U-shaped shoe which projects beyond the end of the other part of the bar from below and secured thereto, and also projecting in upward direction beyond the bar, whereby the end of the bolt projects therefrom, enters into a corresponding aperture of a lever, pivotally secured to the two flanges of the U-shaped shoe projecting above the bars. The bolt passes through the flanges of the profile of one bar end and the lever is retained in its closing position by means of a spring.

The invention will now be described by way of example with regard to Figs. 1 to 11 of the drawings.

Fig. 1 shows a cross section through one bar of the stretcher and part of the cover and carrying belt as well as a secured cross-beam,

Fig. 2 shows another construction of the bar profile,

Fig. 3 shows the profile of the bar according to Fig. 1,

Fig. 4 shows the reinforcement of the bar profile according to Fig. 2 by welding thereto a sheet metal element, looking from the centre of the side of the stretcher,

Fig. 5 shows the reinforcement of the profile of the bar according to Fig. 3 by means of a web secured to the outside thereof, looking from the centre of the side of the stretcher,

Fig. 6 is a view on the end of the stretcher,

Fig. 6a is a cross-section through the stretcher,

Fig. 7 is a side view of the one half of the stretcher with a connection member in assembled condition,

Fig. 8 shows the connection member separated,

Fig. 9 shows a stretcher with a cover,

Fig. 10 shows a connecting member on an enlarged scale in side elevation,

Fig. 11 shows a connecting member in perspective view.

As is to be seen from Fig. 1 to Fig. 3 the bar 1 is formed having a C-profile or C-shaped cross section with a web 2 and flanges 3 and 4 which, at the open side of

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the profile, are lapped inwards with their extensions 5 and 6. In the upper half of the web 2 a longitudinal groove or recess 7 is formed extending into the interior of the profile. The diameter of the space 9 of this recess 7 is greater than the width of the opening 8 located in the plane of the web 2. The recess 7 and the opening 8 extend over the total length of the bar. The attachment of the cover 11 to the bar i.e. to the C-profile takes place in such a manner that the cover 11 having a bead 10 at its border, is pushed into the space 9 of the recess 7, starting at the end of the stretcher.

Furthermore the web 2 of the C-profiles has slots 12 at those parts where carrying belts 13 should be secured, and which correspond in length with the width of the carrying belts 13, as shown in Fig. 1. The attachment of the belts is accomplished by the end of the belt which has a loop 14 which is pushed from outside through the slot 12, and then a pin 15 is pushed into the loop 14.

Below the slots 12 two beads 16 are pressed out of the surface of the web which extend almost along the total length of the web, whereby the profile is additionally reinforced. These smooth beads 16 are the lateral limits of the stretcher. Attention is directed to Fig. 1 wherein it may be seen that bead 16 projects outwardly further than any other portion of the stretcher. Thus, if the stretcher should encounter an obstruction while being transported, it will not catch thereon since the outermost smooth surface 16 of the stretcher will merely slide by the obstruction.

In Fig. 2 another embodiment of a bar 1 having a C-profile is shown. It is constructed of two angle members 17 and 18 having legs 3 and 19, and 4 and 20, respectively. Legs 19 and 20 are connected to each other by any suitable means to form the web 2, while legs 3 and 4 are spaced and oppose each other to define the upper and lower sides of bar 1. These are placed above each other and secured together preferably by spot-welding. The recess 19 which takes up the bead 10 of the cover 11 is formed in the shank of the profile 17 which constitutes a part of to the web 2. The opening of the recess is equal to or wider than the interior space of it. The desired reduction in the slot-like opening of the recess which extends over the length of the profile is obtained by the shank of the other profile 18 which belongs to the web 2 and partly covers the opening of the recess with its edge 20.

To reinforce the C-profile with regard to torsion forces, strip material or a web 21 may be welded as shown in Fig. 4 into this C-profile normal to the axis of the profile.

Still more effective for reinforcement purposes is a web 22 which is welded to the outside or to the inside of the extensions 5 and 6 of the flanges 3 and 4 of the C-profile for a certain width, as shown in Figs. 3 and 5.

The stretcher may be divided into two parts by dividing the two bars in their centres. The two halves 1, 1' of the bars located side by side are connected, as shown in Figs. 1, 6 and 9 with each other by means of a cross-beam constructed of two parts 23 and 23', pivotally connected with each other at 26. This cross-beam 23, 23' is connected to the bars 1 and 1' at the pivot points 25 and 25' respectively. The parts 23, 23' of the cross-beam may be folded into the position 27 and 27' when the halves of the stretcher are collapsed together. In the collapsed condition the cross-beams 23 and 23' with their central pivot point 26 move somewhat beyond the idle or center point. One of the cross-beams, e.g. the cross-beam 23, has an extension 24 projecting beyond the pivot point 26 which bears against the other cross-beam 23' when the stretcher is ready for use.

The pivotal connection of the two cross-beams 23, 23' to 1 and 1' is obtained by means of U-profile elements 31 secured to the profiles 1 and 1' by a bolt 32 which at the same time serves as anchor of the U-profile element 31 to the flange 4 of the C-profile 1 or 1'.

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The bolt 32 may continue through the hollow space in the profile up to the upper flange 3 and thus can also be used for reinforcement purposes against torsion.

The handles 28 and 28' may be folded inwards towards the bars 1 and 1' and stowed within the interior of the profile. For this purpose a bolt 34 is connected to those ends of the handles pointing toward the bars, which passes through the flanges 3 and 4 of the C-profile and which has on its upper end a square shoulder 33. This square shoulder 33 extends into a square aperture in the upper flange 3 of the C-profile, so that the handle 28 is locked against displacement.

As the bolt can be displaced in axial direction against the pressure of a spring 29 it may be pressed downwards together with the handle 28 whereby the square shoulder 33 leaves the associated square aperture. Then the handle 28 may be pivoted into the interior of the C-profile where it is locked by the square shoulder 33 which enters into said aperture again. In this way the handle may also be locked in a position normal to the axis of the bar, which facilitates the transport of the stretcher where space is restricted.

At the upper end of the bolt 34 a carrying ring 30 may be attached to which ropes may be secured to suspend the stretcher.

The bars may be equipped in known manner with runners 35 or wheels or the like to allow transportation over the ground.

The C-profiles used according to the invention are rather weak, as all profiles with a thin wall, when locally strained in a direction normal to the axis of the profile. Such a strain can arise when unsuitable connecting means are used to connect the two halves of the stretcher, e.g. hollow profiles which are merely pushed over the ends of the profile. In this case the C-profiles should be especially heavily reinforced within their ends which would lead to an undesired increase in weight. According to the invention such means are used to connect the ends of the bar halves which convert the lateral pull and push forces originating from the bending stress of the bars in use into longitudinal forces acting upon the C-profile of the bar in a direction parallel to its axis. This occurs because the downward force on the stretcher which is applied to the bars 1 is transferred between the inclined surfaces 40 and 41 and thus this force acts in a direction parallel to the bar 1. A need to boss the C-profile is thus avoided, and a thin-walled profile is sufficient for reinforcement which is pushed into the C-profile and welded thereto.

One form of such connection is shown in Figs. 6, 7 and 8. A U-shaped shoe 36 of strong metal surrounds from below the one end of the bar so that it projects with its two flanges above the upper surface of the C-profile. The C-profile to which the shoe 36 is attached ends within the shoe and has a face 40 which preferably is inclined to the axis of the bar. That part of the shoe 36 projecting beyond the end 40 of the profile has in its lower face an aperture 42. A bolt 37 passing through the adjacent C-profile 1'' normal to the axis of the profile and secured thereto, enters into the aperture 42. The upper end of the bolt 37 is held by a lever 38 which is pivotally mounted to the end of a bolt 39 passing through both shanks of the U-shaped shoe 36, and close to the other end of the bolt an aperture 43 is formed in which the upper end of the bolt 37 projects, when the lever 38 is lifted when assembling the two parts 1 and 1'' of the bar. Then, when the two front faces 40 and 41 engage each other, the lever falls over the upper end of the bolt 37.

The front face 41 of the half 1'' of the bar makes the same angle with the axis of the bar as the front face 40 of the half 1 of the bar. To increase the bearing surface of the two opposite front faces a sheet metal part may be welded which closes the C-profile partly or wholly.

By using such a connection it is possible to dismantle and to assemble the stretcher also on the ground without being lifted substantially.

It is advantageous to secure the connecting means to the inner ends of the halves of the bar in such manner that the two halves of the stretcher are completely symmetrical. In other words, one shoe 36 and one bolt 37 are secured on opposite sides of the stretcher and one on each stretcher half. This allows for replacement of damaged stretcher halves so that e.g. two partly damaged stretchers may be combined to form one good stretcher.

The cover of the stretcher preferably is arranged as shown in Fig. 9. The cover 11 and 11' for both halves of the stretcher is, as described above, pushed with its border 10 into the recesses 7 or 19. Those ends of the bar halves to which the shoes 36 are secured therefore can not be utilized to secure the cover in the above described manner. Therefore a loop 53 or 54 is secured to the inside of the stretcher at the end of the shoe 36 to which the free tip of the cover 11 or 11' is hooked and secured. It is preferable to run the adjacent borders 52 and 51 of the cover 11 and 11' in oblique direction across the stretcher. Thus, the lower left-hand corner of the cover part 11 with reference to Fig. 9, is always pulled taut by means of the border 52 which runs in an oblique direction to the right, and one end of which is secured to the loop 53 of the shoe 36, whereby a displacement of the cover on that end of the bar where it is not attached to a shoe 36, and the formation of folds in the cover is prevented.

Both borders 51 and 52 of the cover parts 11 and 11' may be equipped with eyes 56 or 55 as well as hooks 57 or 58 which keep the border 51 and 52 close together so that when the stretcher is loaded no substantial slot may appear.

In Figs. 10 and 11 the connecting element is shown enlarged. To facilitate the introduction of the end of the bar carrying the bolt 37 into the shoe 36 it is formed at its outer end 46 with a funnel. Furthermore the outer end of the lever 38 forms with the part 45 an obtuse angle and the end of the bolt 37 adjacent the lever 38 is formed with an inclined face 44. Thus the upper end 44 of the bolt 37 can lift the lever 38 after the lower end of the bolt 37 has been inserted into the aperture 42 of the shoe 36. The lever 38 is then swung over the upper end of the bolt 37 to secure it by means of the leaf spring 48 which is inserted below the pivot bolt 39 with a depression which surrounds part of the bolt's surface when the two front faces 40 and 41 of the ends of the bars 1, 1" bear against each other.

To increase the bearing surface of the two ends of the bars 1 and 1" disks 49 and 50 may be welded thereto.

It is preferable to position the front faces 40 and 41 at an angle to the axis of the bars such that the lower surface 4 of the part 1" of the bar projecting into the shoe 36 of the other part 1 of the bar, is longer than its upper surface 3 located in the open side of the shoe

36. This allows an easy assembling of the two parts of the bar, and on the other hand prevents the connected ends of the bar displacing each other in axial direction. Besides that, the support of the lower end of the bolt 37 within the associated end of the part 1" of the bar is improved because the hole in the lower surface 4, i.e. in the flange 4 of the C-profile, is located further inwards off the front end 41.

To reinforce the border of the holes e.g. of the hole 42 in the shoe 36, a reinforcement disk 47 may be provided which is welded to the shoe 36.

What I claim is:

1. A foldable stretcher wherein the longitudinal support rails in the storage position may abut each other along their lengths, comprising a pair of longitudinal support rails having C-shaped profiles to define compartments therein and having smooth outer surfaces to prevent catching on foreign objects, a plurality of transverse members pivotally connected between said rails for disposition within said compartments, a cover, means mounting said cover along the length of said rails, said means being disposed within the outer surfaces of said rails, said rails being divided in the middle so that two stretcher halves are formed, means for connecting the divided rails to each other including a pair of large shoes surrounding the rails and disposed on obliquely opposed portions of the stretcher halves, said cover being made in two parts and detachably joined along a straight line disposed at an angle to said rails, each part being attached along its longer side to an inward portion of the adjacent shoe, a plurality of handles pivotally connected to the outer ends of the rails, means for locking and unlocking said handles with respect to the rails so that said handles may be pivoted into a storage position within said compartments.

2. The stretcher of claim 1 wherein said transverse members are formed of two links pivotally connected together, stop means on said members permitting movement of the members from a folded position within said compartments to an open position wherein the links are in an overcenter relation so that a force urging said rails together will not move the rails together until the links are moved out of the overcenter relation.

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