United States Patent

[11] **3,601,824**

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[54] **COLLAPSIBLE STRETCHER HAVING REMOVABLE BED SECTION**
12 Claims, 6 Drawing Figs.

[52] **U.S. Cl.** **5/82**
[51] **Int. Cl.** **A61g 7/10**
[50] **Field of Search** 5/81, 82, 112, 89, 317, 327

[56] **References Cited**

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ABSTRACT: A collapsible and portable stretcher having a breakdown rectangular frame and a flexible sheet forming a bed for the stretcher but removable therefrom. The flexible sheet has side flats which can be drawn and held together over the bed by way of hooks on one flap and cord-receiving members on the other flap, a cord being threaded through the cord-receiving members to form loops which are caught on the hooks, the cord then being drawn tight and snugged. The stretcher is rapidly disassembled and packed into a compact carrying pack formed from the bed itself and the removable flexible sheet can itself, without frame, be utilized for securing and carrying a patient.

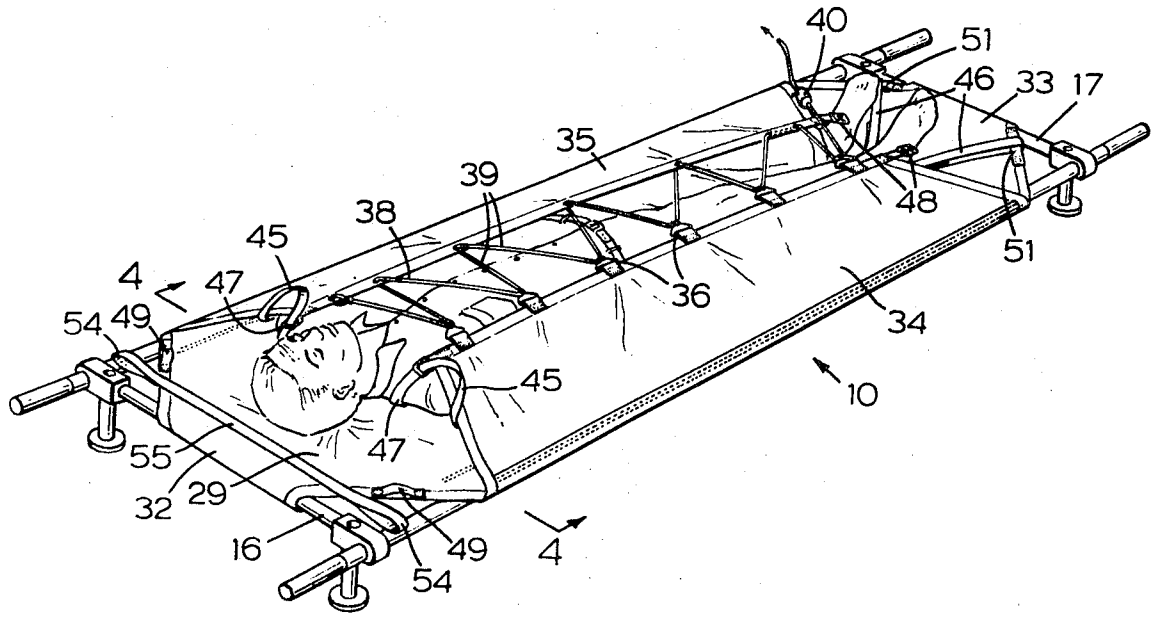
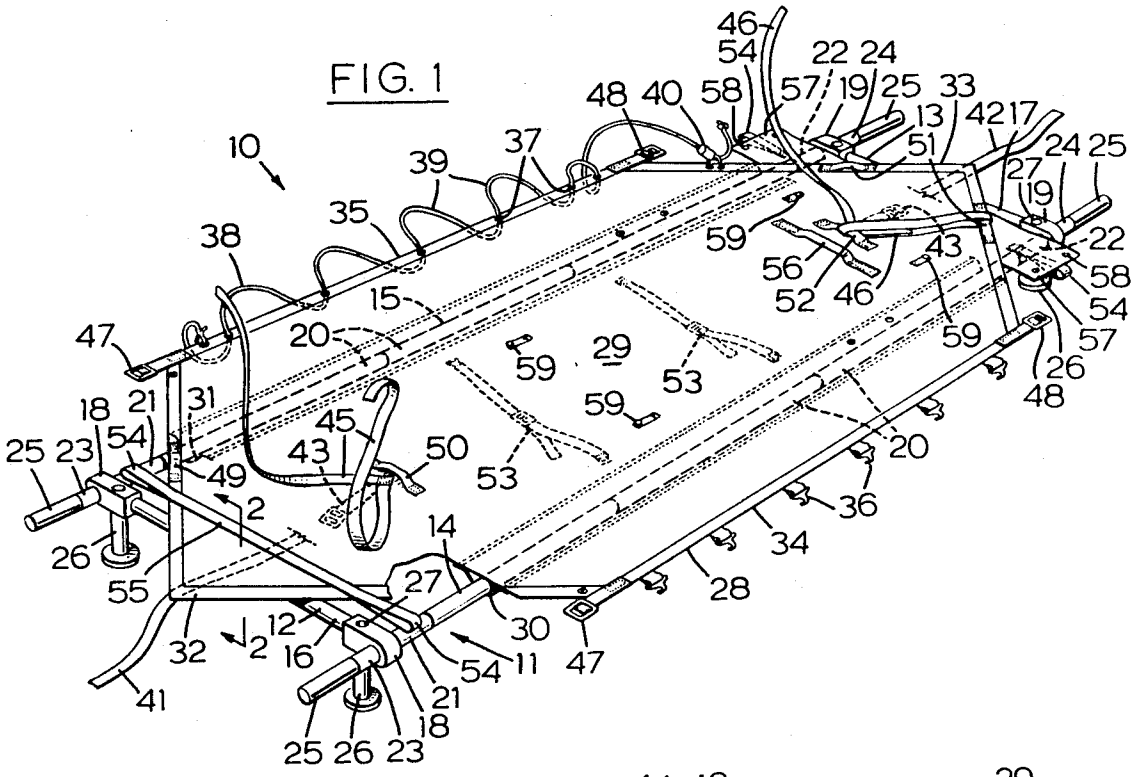


FIG. 1



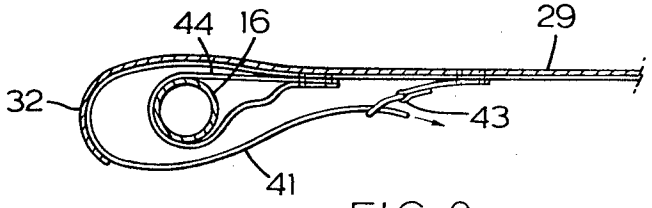


FIG. 2

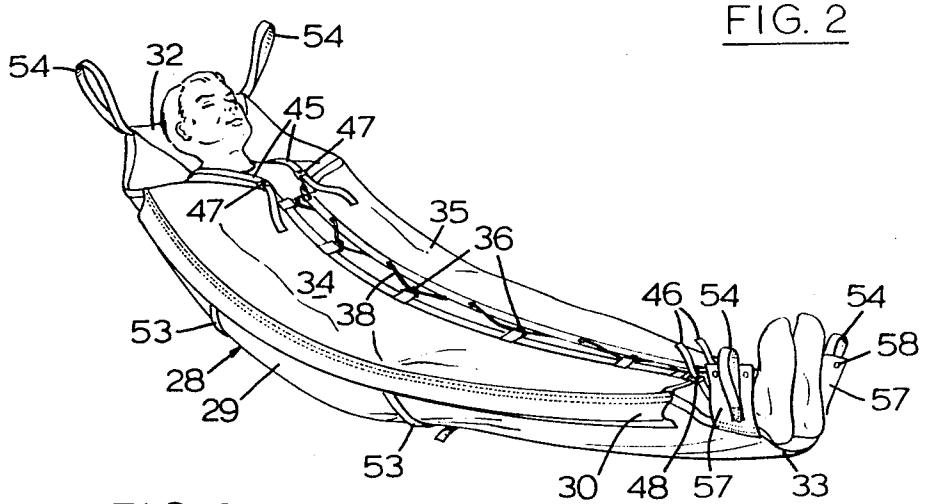


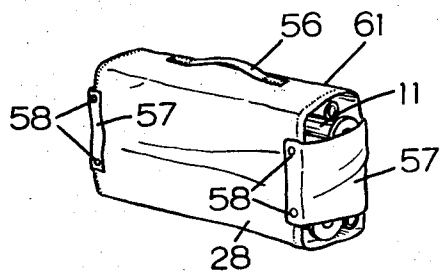
FIG. 6

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FIG. 5



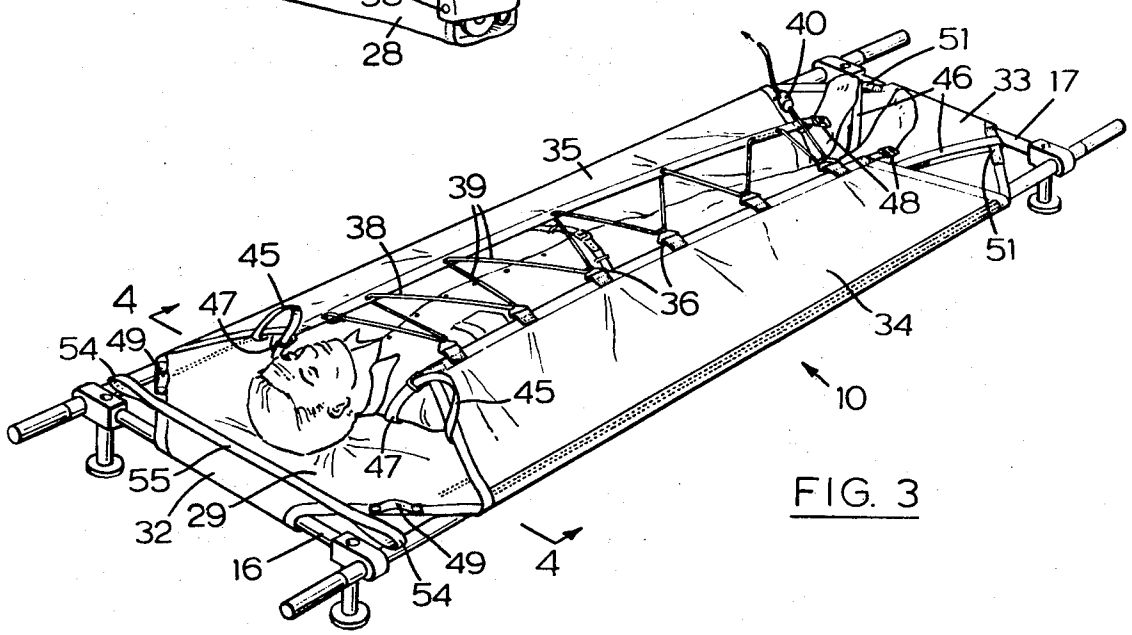


FIG. 3

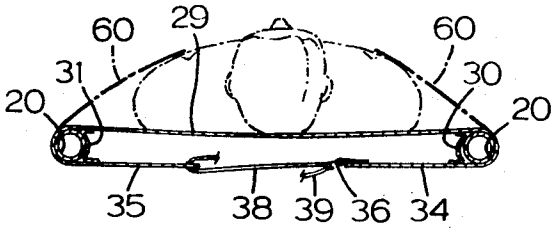


FIG. 4

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COLLAPSIBLE STRETCHER HAVING REMOVABLE BED SECTION

BACKGROUND OF THE INVENTION

There is a pressing need in the medical and military fields for a light, easily assembled and disassembled collapsible stretcher which is still rigid and strong enough for demanding service. Furthermore, it would be most advantageous to have such a stretcher available which can be stored in a compact bundle in the disassembled state and which can be easily carried by one person. Although collapsible stretchers are available which can be put into service and collapsed quite quickly, all suffer from at least one of the disadvantages of being too heavy, too cumbersome in the disassembled state, not compact and easily packed and transported in the collapsed state, not rigid and strong enough when put in service or not easily maneuverable or even usable in difficulty accessible areas.

In U.S. Pat. No. 3,336,060, dated Aug. 15, 1967, the present inventor describes a collapsible stretcher having a takedown frame which is light, easily portable, rigid and strong. However, this stretcher has a number of disadvantages. Thus, although it is readily disassembled into a bundle of components, these components must be packed into a separate bag or container for carrying purposes. Loss of the carrying bag, such as under battlefield conditions, could cause a problem with respect to portability of the stretcher and/or loss of one or more of the components thereof. There is a further disadvantage in this prior art stretcher in the time required to secure the patient to the bed of the stretcher if such is necessary. Another problem resides in removal of an injured person from difficulty accessible areas using this prior art structure. Although it can be quickly assembled at any location, there could be difficulty in removing the assembled, rigid structure with a casualty thereon from a difficult area.

A portable and collapsible stretcher has now been devised which overcomes problems encountered with prior art stretchers with respect to portability, rapid securing of a casualty and accessibility to and/or from difficult areas.

SUMMARY

The collapsible and portable stretcher of the invention has a rectangular, takedown frame comprising two end frame members, each having a tubular connecting member subtended by and connected to a housing member at each end, and two side frame members releasably connected to the housing members to form the frame. The side frame members comprise at least two tubular sections releasably connected end to end. A flexible sheet is removably located on the frame and forms a bed for the stretcher. The sheet has a central bed section located between the sides of the frame, two longitudinal sleeves through which the side frame members extend and two end flap members located over and attached to the tubular connecting members on the ends of the frame. The flexible sheet also has two side flaps located along and outside each longitudinal sleeve with hook fasteners along the edge of one side flap and cord-receiving members along the edge of the outer side flap. The flap with the cord-receiving members has a cord attached to one end with the cord being threaded through the cord-receiving members to form loop portions between them. The loops engage with the hook fasteners when the side flaps are folded over the central bed section and a tightening and securing means on the stretcher is used to tighten and hold the cord when the loops have been engaged with the hook fasteners.

It is an object of the present invention to provide an easily disassembled collapsible stretcher which can be quickly stowed for carrying purposes.

A further object of the invention is to provide a strong but collapsible stretcher with a removable bed portion which can itself be used as a flexible stretcher for use in difficulty accessible areas.

Other objects and advantages of the invention will be apparent from the following description taken in conjunction with the accompanying drawing.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a perspective view of a collapsible stretcher embodying the invention, shown with a portion thereof broken away;

FIG. 2 is a vertical sectional view of a variation of an end flap of the stretcher taken through line 2—2 of FIG. 1;

FIG. 3 is a perspective view of the stretcher shown in FIG. 1 with a casualty secured therein;

FIG. 4 is a vertical sectional view taken through line 4—4 of FIG. 3 but with side flaps of the stretcher retained underneath the bed portion thereof;

FIG. 5 is a perspective view of the stretcher shown in FIGS. 1 and 3 disassembled and stowed, using the bed portion as a carrying case therefor; and

FIG. 6 is a perspective view of the bed portion of the stretcher shown in FIGS. 1 and 3, removed from the frame and containing a casualty strapped therein.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

An embodiment of the collapsible and portable stretcher device of the invention is shown in perspective in FIG. 1, fully assembled and ready to receive a casualty or patient. The stretcher **10** has a rectangular, tubular frame **11** similar to that disclosed in U.S. Pat. No. 3,336,060, dated Aug. 15, 1967, of the present inventor. The frame **11** has two end frame members **12, 13** and two side frame members **14, 15** releasably engageable with the end members **12, 13**. Each of the end frame members **12, 13** comprises a tubular connecting member **16, 17** subtended at each end by and connected to housing members **18, 19** respectively. The side frame members **14, 15** are made of at least two sections, three sections **20** being shown in FIG. **1**, releasably connected together end to end. The side frame members **14, 15**, the housing members **18, 19** and the connecting members **16, 17** assembled as shown in FIG. **1** make up the rectangular tubular frame **11** for the stretcher **10**.

The members of the frame **11** are advantageously constructed in a manner similar to the stretcher frame disclosed in U.S. Pat. No. 3,336,060, aforementioned. Thus, the sections **20** of the side frame members are releasably socketed together and are preferably connected to one another by flexible cord or chain members located in the ends of the sections and held in tension to allow the sections **20** of the side frame members to be positively and quickly socketed together when the stretcher is being assembled. The tubular connecting members **16, 17**, which are subtended by the housing members **18, 19** to form the end frame members **12, 13**, may be releasably connected to the housing members **18, 19**, although as described hereinafter, the end frame members are advantageously left fully assembled when disassembling and stowing the stretcher for carrying by one person. As shown in FIG. **1**, the housing members **18, 19** have inwardly projecting tube members **21, 22** respectively which provide connecting members for the side frame members **14, 15**. Thus, the tubes **21** on the housing members **18** of the end frame member **12** provide, for example, releasable socket connections for female connecting ends on the side members **14,15** and the tubes **22** on the housing members **19** of the end frame member **13** provide female connecting ends for releasable socket connections on the other ends of the side members **14, 15**.

The housing members **18, 19** have outwardly projecting tubes **23, 24**, opposite tubes **21, 22**, which provide handle connections for the stretcher. Handle members **25** are advantageously releasably socketed into the tubes **23, 24**. When the stretcher is disassembled the handles **25**, which are preferably inwardly attached to the tubes **23, 24** by flexible chains or cords, can be removed from the tubes **23, 24** and folded inwardly along the connecting members **16, 17**. As shown in FIG. **1**, the housing members have tubular leg mem-

bers **26** preferably releasably attached thereto by way of downwardly projecting tubes on the housing members and socket portions **27** are located on the top of the housing members **18, 19** to receive vertical support members upon which another stretcher can be placed in bunk style.

A flexible sheet **28** forms a bed for the stretcher **10** and the sheet **28** comprises a central bed section **29** located between the side frame members **14, 15**, a pair of longitudinal sleeves **30, 31** through which the side frame members **14, 15** extend, two end flap members **32, 33** which are located over and attachable to the tubular connecting members **16, 17** respectively, and two side flap members **34, 35** integral with and located along and outside the longitudinal sleeves **30, 31** respectively. The side flap **34** has a series of hook fasteners **36** located along the edge thereof and cord-receiving members, such as loops or grommets **37**, as shown in FIG. **1**, are located along the edge of the other side flap **35**. A cord member **38** is threaded through the grommets **37** shown in FIG. **1** and one end of the cord **38** is attached at one end of the side flap **35**. Portions of the cord **38** between the grommets **37** can be pulled out to form loops **39** which are engageable with the hook fasteners **36** when the side flap members **34, 35** are folded over the central bed section **29**. A tightening means **40** is attached to the stretcher and the other end of the cord member **38** is engageable therewith and the cord **38** is tightened and then held by the tightening means **40** in order to hold the flap members **34, 35** tightly in folded position over the central bed section **29**.

Although the end flaps **32, 33** are shown in FIG. **1** as being merely draped over the tubular connecting members **16, 17** respectively, the flaps **32, 33** are attached to the connecting members **16, 17**, such as by way of attachment straps **41, 42**, respectively which are integral with the flaps **32, 33**, perpendicular to the connecting members and are drawn through and held by holding means located under and attached to the central bed section **29**, such as buckles **43**. The arrangement of one of the flaps **32** and the attachment strap **41** around the connecting member **16** and through the buckle **43** is clearly shown in FIG. **2** which is an enlarged sectional view of an end portion of the stretcher taken along line **2—2** of FIG. **1**. In FIG. **2** an alternative additional feature which may be associated with the end flaps **32, 33** is shown in the form of a separate permanently closed flap or loop member **44** attached to the end flap **32**, with the connecting member **16** being located therethrough. A similar loop member may be located at the other end of the stretcher on the end flap **33**. The loop members **44** serve to keep the end frame members **12, 13** connected to the flexible sheet **28** to prevent accidental displacement of an end frame member when the frame **11** is disassembled and stowed in the sheet **28**, as described hereinafter. The straps **41, 42** are shown broken away under the central bed section **29** in FIG. **1** but these straps are advantageously one continuous strap running from end to end on the underneath side of the sheet **28** and attached thereto along its full length, as partially shown in the broken away sectional view of FIG. **2**. This continuous nature of the straps **41, 42** allows the central bed section **29** to be tightened lengthwise by tightening the straps **41, 42** on the buckles **43** while avoiding direct stress on the section **29** of the sheet **28**.

Referring now to FIG. **3**, taken in conjunction with FIG. **1**, the stretcher **10** of FIG. **1** is shown with a casualty or patient restrained therein. The patient is placed on the central bed section **29** and the side flap members **34, 35** are folded over the patient, the cord member **38** is loosened to allow the loops **39** to engage with the hook fasteners **36** and the cord **38** is tightened and held by the tightening means **40**, which is advantageously a quick release device located on the side flap **35** through which the cord **38** is drawn, as shown in FIGS. **1** and **3**. The end flap members **32, 33** are shown attached around the connecting members **16, 17** respectively in FIG. **3**. The patient is held firmly in position by way of shoulder-restraining strap members **45** and foot-restraining strap members **46** attached to the upper side of the central bed section **29** at opposite ends thereof as shown in FIG. **1**. The shoulder straps **45** are engageable with first fastening members such as buckles **47** located on and at one end of the side flap members **34, 35** and the foot straps **46** are engageable with second fastening members such as buckles **48** located on and at the other end of the side flap members **34, 35**. In FIG. **3** the shoulder straps **45** are shown placed around the shoulders of the patient and tightened and cinched in the buckles **47** but the foot straps **46** are shown merely stowed under the feet of the patient. The straps **46** may be secured around the feet of the patient and then tightened and cinched in the buckles **48**. Advantageously, each of the straps **46** are looped around the sole of a foot of the patient and then attached to an opposite one of the buckles **48**. The shoulder straps **45** are stowed when not in use by feeding them through and around side loops **49** (only one being shown in FIG. **1**) and loop **50** located at the centerline of the bed section **29**. The foot straps **46** are stowed as shown in FIG. **3** by feeding them through and around side loops **51** and center loop **52**, one of the straps **46** being shown stowed in this manner in FIG. **1**.

Advantageously, two cross tightening straps **53** are attached to and located under the central bed section **29**, as shown in FIG. **1**, the straps **53** being so located so as to take up slack in the sheet **28** above and below the hips of a person located in the stretcher. Carrying members or loops **54** are attached to the end flaps **32, 33** at each side thereof and are utilized for carrying the flexible sheet **28** removed from the frame **11** with a person secured thereon as described hereinafter. A carrying strap **56** is advantageously attached at one end of the flexible sheet **28** to provide means for carrying the rolled up sheet with disassembled members of the frame **11** stowed therein. Furthermore, securing flaps **57**, shown in FIG. **1**, are advantageously attached at one end of the flexible sheet **28** with first fastening devices such as dome fasteners **58** thereon engaging with second fastening devices such as dome fasteners **59** located on the sheet **28**. The flaps **57** and the fasteners **58, 59** as so placed to allow the flaps to close off the ends of the sheet **28** when rolled up with the collapsed or disassembled members of the frame **11** stowed therein as shown in FIG. **5**. The carrying loops **54** subtend crosswise strap **55** attached to the end flap **32** but on the end flap **33** the loops **54** are advantageously attached to the undersides of the flaps **57**, as shown in FIG. **1** and in FIG. **6**, referred to hereinafter.

Referring now to FIG. **4**, instead of being folded and secured over a person on the stretcher, as shown by broken lines **60**, the side flaps **34, 35** may be folded under the central bed section **29** with the loops **39** in the cord **38** being engaged in the hook fasteners **36** and the cord **38** then being drawn tightly. Advantageously, the side flaps **34, 35** are stowed in this underneath position when the stretcher is disassembled and rolled up as shown in FIG. **5**.

When disassembling and stowing the stretcher, referring to FIG. **1**, the side flaps **34, 35** are secured under the central bed section **29**, as shown in FIG. **4**, the side frame members **14, 15** are released from the tubes **21, 22** of the housing members **18, 19** and are drawn out of the longitudinal sleeves **30, 31**. The sections **20** of the side frame members **14, 15** are then unsocketed and folded upon each other. The handles **25** are unsocketed from the tubes **23, 24** on the housing members **18, 19** and are folded against the connecting members **16, 17**. The straps **45, 46** are preferably stowed around the loops **49, 50** and the loops **51, 52** respectively. The sections **20** of the side members **14, 15** are bundled against the connecting member **16** along with the handles **25** at the end of the stretcher. The whole end frame member **12** is then rolled with the sections **20** in the sheet member **28** towards the other end of the stretcher but with the sheet **28** turned over from the position shown in FIG. **1**. The whole end frame member **13** is rolled together with the end frame member **12** and the sections **20** to form a bundle **61** as shown in FIG. **5** so that the flaps can be drawn around and close off the open ends of the rolled sheet **28** with the frame members **11** stowed therein and so the dome fasteners **58** meet and engage with the dome fasteners **59**

(seen in FIG. 1). The bundle 61 can then be easily carried by one person by way of the carrying strap 56. The bundle is made more rigid and more easily packed by socketing the end frame members 12, 13 together by way of tube members or spigots 21, 22. Assembling of the stretcher is carried out by merely reversing the afore-described procedure.

It is to be noted that, if desired, the sleeves 30, 31 may be relieved by openings or notches to allow easy access to the sections 20 of the side members 14, 15 and in particular to allow access to the joins between the sections 20 and permit separation of the sections 20 for separate removal of each section if need be in close quarters. Such openings in the sleeves 30, 31 alternatively allow easy folding of the separated sections 20 one upon the other while still in the sleeves 30, 31 to permit portability of the stretcher in a compact state without removal of the side members 14, 15 from the sleeves 30, 31.

One of the main advantages of the stretcher device of the present invention is the feature of complete removability of the flexible sheet 28 from the frame 11 and the use of the flexible sheet without frame as a flexible securing and supporting means for an injured person. Such a feature is, of course, most useful in removing people from close and/or difficulty accessible quarters. Referring to FIG. 6, an injured or ill person is seen secured in the flexible sheet 28 with all members of the frame 11 (see FIG. 1) removed therefrom. In such case the disassembled stretcher stowed as shown in FIG. 5 is unrolled and the end frame members 12, 13 are removed therefrom by unfastening the end flap members 32, 33. The casualty is placed on the central bed section 29 of the flexible sheet 28 after the side flaps 34, 35 have been released and placed each side of the central section 29. The side flaps 34, 35 are then placed over the casualty and are secured by engaging the loops 39 with the hooks 36, the cord 38 then being pulled tight and snugged. The shoulder straps 45 are then placed around the casualty's shoulders and are tightened and secured in the buckles 47. The foot straps 46 are also secured around the feet of the casualty and any slack around the hips of the casualty is taken up by tightening the straps 53, if desired. The casualty is then transported easily by two persons by way of the carrying loops 54. The complete frame 11 of the stretcher is easily placed in position on the flexible sheet 28, when and if desired, by feeding the assembled side frame members 14, 15 into the longitudinal sleeves 30, 31, socketing the side frame members 14, 15 together with the end frame members 12, 13, securing the end flap members 32, 33 over the connecting members 16, 17 and socketing the handles 25 into place on the housing members 18, 19. The stretcher is thereby very quickly assembled and ready for use.

It is to be noted that a further advantageous feature of the present stretcher is its usability with a fracture board located on the bed section with the patient then being secured as before with the side flaps and the shoulder and foot straps.

It can be seen that the stretcher of the present invention is exceedingly versatile and can be used to reach inaccessible areas while being carried in a compact bundle by one man. With a frame made from extruded aluminum and a bed section fabricated of flexible, but strong and durable, plastic the stretcher is very light and yet strong and rigid. At the same time, the stretcher is easily and economically fabricated and is therefore quite inexpensive compared with stretchers of the prior art. Fabrication of the frame of the stretcher from a light but strong and durable plastic, such as polycarbonate plastic, further reduces the total weight of the stretcher. The complete removability of the bed section from the frame with separate use of this bed section as a litter in which to secure and carry a casualty is, of course, a most attractive feature of the stretcher of the present invention.

What I claim: as my invention is:

1. A collapsible and portable stretcher device having a rectangular tubular frame with two end frame members and two side frame members engageable with the end frame members, each of said end frame members comprising a tubular connecting member subtended at each end by a housing member connected thereto, each of said side frame members comprising at least two tubular sections releasably connected end to end, said side frame members being releasably connected to said housing members to form said rectangular tubular frame, and a flexible sheet forming a bed for said stretcher, said sheet comprising a central bed section located between said side frame members, a pair of longitudinal sleeves through which said side frame members extend, end flap members located over and attached to said tubular connecting members in said end frame members, two side flap members integral with and located along and outside each of said longitudinal sleeves, hook fasteners located along the edge of one side flap member, cord-receiving members located along the edge of the other side flap member, a cord member attached to said side flap member containing the cord-receiving members at one end thereof, said cord member being threaded through said cord-receiving members to form loop portions there between, said loops being engageable with said hook fasteners upon folding of said side flap members over said central bed section, and a tightening means for pulling said cord member tight and holding the same upon engagement of said loops with said hook fasteners, said flexible sheet member being removable from said frame for placement and securing of a person thereon without said frame connected thereto.

2. A stretcher device as claimed in claim 1 wherein the cord-receiving members are grommets.

3. A stretcher device as claimed in claim 1 wherein each end flap member of the flexible sheet has an attachment strap integral therewith and substantially perpendicular to the respective connecting member, each said attachment strap being releasably attached to a separate strap holding member located under and attached to the central bed section, said attachment straps being tightened to tighten said central bed section lengthwise.

4. A stretcher device as claimed in claim 3 wherein shoulder-restraining straps are attached to the upper side of the central bed section of the flexible sheet at one end thereof engageable with first fastening members located on the side flap members and foot-restraining straps are attached to the upper side of said central bed section at the other end thereof engageable with second fastening members located on the side flap members.

5. A stretcher device as claimed in claim 4 wherein the cord-receiving members are grommets.

6. A stretcher device as claimed in claim 1 wherein carrying members are attached to each side at each end of the flexible sheet to assist in supporting the flexible sheet with the frame removed therefrom and a person secured therein.

7. A stretcher device as claimed in claim 1 wherein the tightening means for the cord member is a quick release device through which the cord is drawn.

8. A stretcher device as claimed in claim 1 wherein each end flap member has a separate permanently closed loop member attached thereto through which each tubular connecting member is located.

9. A stretcher device as claimed in claim 1 wherein two tightening straps are located under and attached to and across the central bed section of the flexible sheet, said tightening straps being placed to take up slack in the sheet above and below the hips of a person located on the sheet.

10. A stretcher device as claimed in claim 1 wherein securing flaps are attached at one end of the flexible sheet with first fastening devices thereon engaging with second fastening devices also located on the flexible sheet, said securing flaps and said first and second fastening devices being so placed to allow said flaps to close off the ends of said sheet when rolled up with collapsed members of said frame stowed therein and a carrying strap is attached to said flexible sheet for carrying said rolled up sheet with the frame members stowed therein.

11. A stretcher device as claimed in claim 5 wherein carrying members are attached to each side at each end of the flexible sheet to assist in supporting the flexible sheet with the frame removed therefrom and a person secured therein and

two tightening straps are located under and attached to and across the central bed section of the flexible sheet, said tightening straps being placed to take up slack in the sheet above and below the hips of a person located on the sheet.

12. A stretcher device as claimed in claim 11 wherein securing flaps are attached at one end of the flexible sheet with first fastening devices thereon engaging with second fastening devices also located on the flexible sheet, said securing flaps and said first and second fastening devices being so placed to allow said flaps to close off the ends of said sheet when rolled up with collapsed members of said frame stowed therein and a carrying strap is attached to said flexible sheet for carrying said rolled up sheet with the frame members stowed therein.