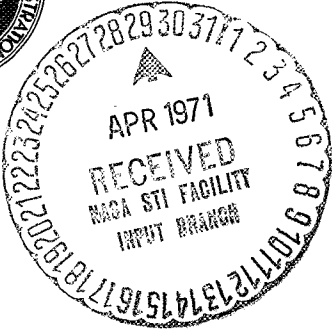




NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

WASHINGTON, D.C. 20546

REPLY TO
ATTN OF: GP



March 27, 1971

TO: USI/Scientific & Technical Information Division
Attention: Miss Winnie M. Morgan

FROM: GP/Office of Assistant General
Counsel for Patent Matters

SUBJECT: Announcement of NASA-Owned
U.S. Patents in STAR

In accordance with the procedures contained in the Code GP to Code USI memorandum on this subject, dated June 8, 1970, the attached NASA-owned U.S. patent is being forwarded for abstracting and announcement in NASA STAR.

The following information is provided:

U.S. Patent No. : 3,343,180

Corporate Source : Macon-Rust Co. *Lapington, Kentucky*

Supplementary Corporate Source : _____

NASA Patent Case No.: XMF-06589

GP Parker
Gayle Parker

Enclosure:
Copy of Patent

FACILITY FORM 602

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(ACCESSION NUMBER)

5
(PAGES)

(NASA CR OR TMX OR AD NUMBER)

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(CODE)

(CATEGORY)

STRETCHER

Filed April 18, 1966

2 Sheets-Sheet 2

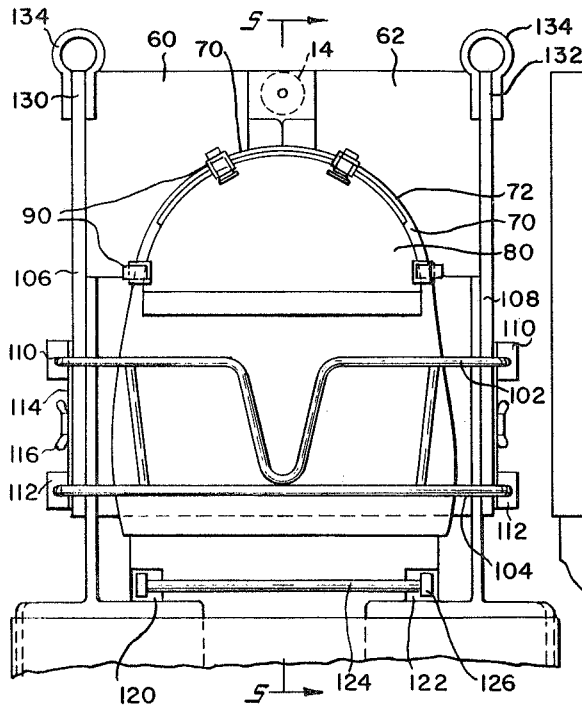


Fig. 2

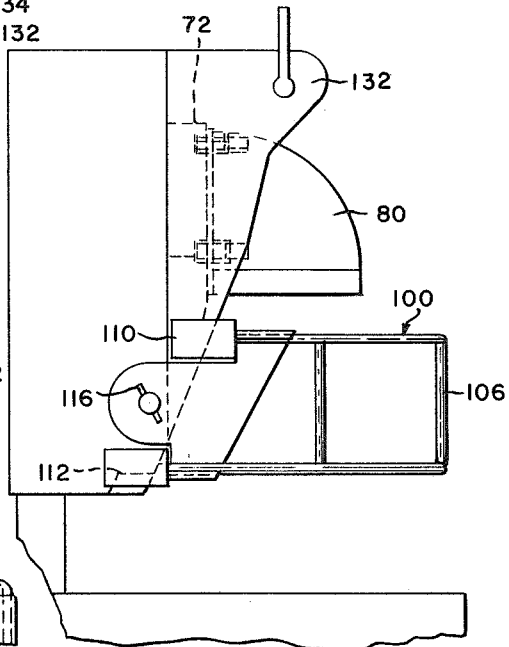


Fig. 3

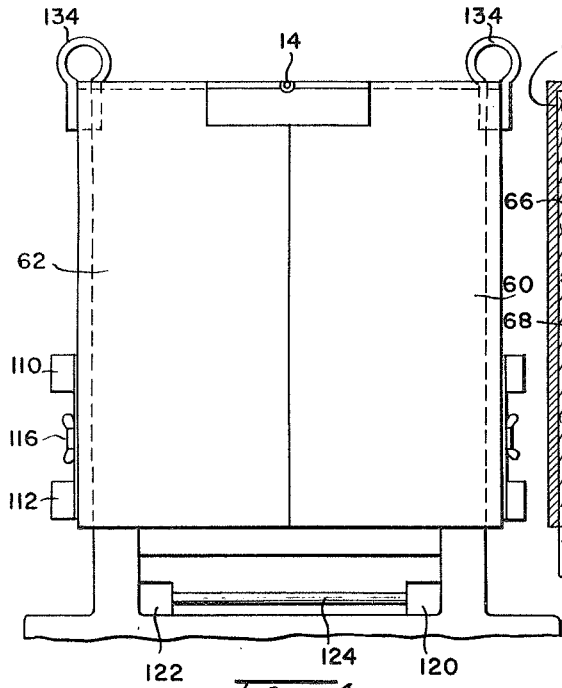


Fig. 4

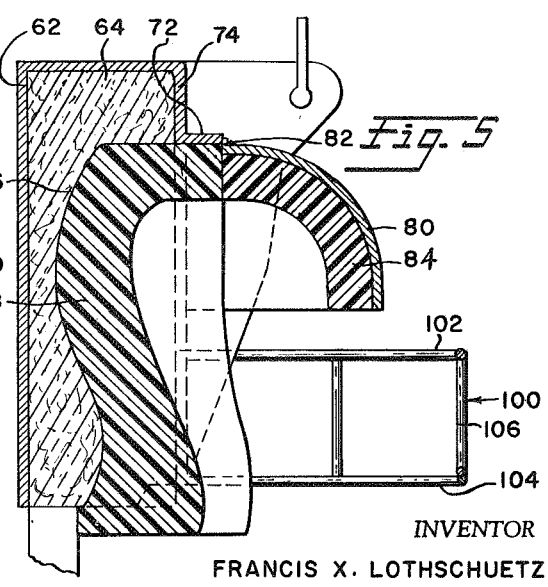


Fig. 5

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1

3,343,180
STRETCHER

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Filed Apr. 18, 1966, Ser. No. 543,206
5 Claims. (Cl. 5—82)

ABSTRACT OF THE DISCLOSURE

A stretcher having at the head end thereof a relatively rigid head support for giving lateral, fore-and-back, and longitudinal support to the head and neck of the person on the stretcher. A detachable head piece provides the support for the fore part of the head. The principal parts of the head support can be made separable along parting lines between identical halves for incorporation in a splint-stretcher.

The invention described herein was made in the performance of work under a NASA contract and is subject to the provisions of Section 305 of the National Aeronautics and Space Act of 1958, Public Law 85-568 (72 Stat. 435; 42 U.S.C. 2457).

This invention relates broadly to stretchers and similar devices for supporting and moving an injured or ill human being.

In the use of stretchers of all types there is often a great and important necessity to maintain the head of the injured or ill person as immobile as possible, this being most important in the case of a person who has suffered injury to the head or neck. Accordingly, it has been a principal object of this invention to provide, in connection with a stretcher structure, an improved and useful structure for giving lateral, fore-and-back, and longitudinal support to the head and neck of the person on the stretcher, thereby rendering these parts substantially entirely immobile, while at the same time being so constructed that the patient is made as comfortable as possible.

In certain modern apparatus such as space capsules, diving bells and the like, within which one or more human being may be housed while in operation, the only access provided is through one or more hatch openings which permit only somewhat difficult passage and do not permit an immobilized person in the interior to be removed by the usual type of horizontally positioned and carried stretcher. However, the necessity for removing an immobilized person from such a vehicle or enclosure has arisen and will arise and presents great problems, and in one aspect of the invention it has therefore been a principal object to provide a stretcher having means for supporting in a vertical position on it the immobilized body of a person, whereby the stretcher and the person on it may be hoisted vertically through the vehicle hatch to the exterior.

In United States Letters Patents No. 2,417,378 to Robinson, and No. 3,125,766 to Halperin, there are disclosed variations of a type of stretcher known as the splint-stretcher. Stretchers of this type are formed of two longitudinally extending side parts which may be separated or pivotally connected at either or both ends in order to permit the two side parts to be separated at one end about a pivotal connection at the other, then brought scissors-like under the sides of the body of a prone person, after which the parts at the separated end are connected to form the stretcher into a unit for carrying purposes. While the present invention is not limited in its utility to stretchers of this type it does have great utility

2

with them and one of the embodiments disclosed in this application will be described in connection with, and as applied to, a stretcher of this type.

The invention is described in the following specification and is illustrated in the accompanying drawings, in which:

FIG. 1 is a perspective view of a stretcher of the splint-stretcher type including the parts at the head and foot ends thereof which are provided by the present invention, all of the parts being shown in open position to be brought under the body of a prone person;

FIG. 2 is a front elevational view of the means provided by the invention for holding the patient's head immobile, being shown in the closed position which they would occupy in use;

FIG. 3 is a side elevational view of the parts shown in FIG. 2;

FIG. 4 is a rear view;

FIG. 5 is a sectional view taken on line 5—5 of FIG. 2, and

FIG. 6 is a partial view of the head end of a stretcher of the fixed type showing applied thereto the head receiving and holding means provided by the invention.

The means provided by this invention are disclosed in FIGS. 1 to 5 in association with a splint-stretcher designated generally at A and having two substantially identical side frame members 2, 4. These side frame members are provided with means at each end for pivotally connecting them together, which means may be separated to permit a scissors-line operation of the side members from either end. The side members are disposed in spaced parallel relation when connected at both ends so that each underlies and supports one of the side portions of a body placed on the stretcher. The connected frames are provided with means for supporting the head and legs of the torso, and the leg-supporting portions may be adjustably extended in length, so that the stretcher will conform to the height of the person placed and carried thereon.

As the two frame members are substantially identical, a description of one will suffice to explain the construction and operation of both. Side member 2 comprises a main torso-supporting frame 6 and an extendable, leg-supporting frame 8 having a projecting rod 10 slidable in a tubular channel 12 extending through the main frame. Means 14 are provided at the head end of the stretcher for either pivotally connecting the side members or for permitting their separation at that end, and similar means 16, 18 are provided at the foot end, thus allowing a scissors-like operation of the side members to be effected from either end.

The main frame section 6 has a smooth and relatively wide upper surface 20 which is preferably generally flat in transverse section, and the upper surface of which is preferably inclined downwardly and inwardly with respect to the transverse plane of the stretcher. Adjacent the outer edge part of the frame section 6 there is provided longitudinal openings 22 which reduce the weight of the frame and provide hand holes for carrying the stretcher, and the continuous outer edge of frame section 6 is preferably thickened to provide a rounded hand-grip or bead 24.

The adjustably extendable frame section 8 has an inwardly projecting plate portion 30 for supporting a leg of the body placed on the stretcher, and said portion may be apertured at 31 for lightness and other purposes. The section 8 preferably has a longitudinally extending tubular opening to provide a socket for receiving one end of the rod 10, which is fastened in such socket. A transverse end member 32 is secured to the outer end of frame section 8 and each of these carries one of the members 16, 18 which provide means for pivotally connecting or separating the two side frame members at that end.

As stated herein before, the two side frame members of the splint-stretcher are substantially identical, and as details of their construction do not form part of this invention reference is made to the aforesaid Letters Patent for a more detailed description of such details.

Each of the stretchers described in this specification includes means for restraining a body placed on the stretcher, as shown in FIG. 1 such means comprise cooperating flexible wrap-around members 40, 42 each of which is attached along its one longitudinal edge to the continuous edge part 24 which extends along the outer edge of the torso-supporting frame part 6, and second co-operating flexible wrap-around members 44, 46 each of which is attached along its one longitudinal edge to the rod 10 adjacent the foot end of the stretcher. Associated with each of those restraint members are the parts of a plurality of airplane or automobile type seat belts 50 for holding the restraint members in place about the torso and legs of a body placed on the stretcher. The restraint members are preferably formed of quilted vinyl stuffed with foam rubber although other suitable materials may be used.

Means are provided by the present invention for association with the stretcher structure described above in order to provide lateral, fore-and-aft and longitudinal support to the head and neck of a person on the stretcher, regardless of whether the stretcher is in a vertical, horizontal or other position. Such means comprise a supporting structure consisting of a substantially flat plate formed of two substantially identical parts 60, 62 each of which is welded or otherwise permanently attached to one of the side frame members of the stretcher at the head end thereof. When the two halves of the stretcher are brought together in parallelism these two halves present a substantially continuous flat surface facing upwardly if the stretcher is in a horizontal position and inwardly into the stretcher when the same is in a vertical position. Permanently attached to the upper or inward side of this surface is a head mould member comprising a block 64 formed of substantially rigid, light-weight material, such as fiber glass. Again, when forming part of a stretcher of a type described above, this block is formed of two substantially identical halves, each of which is permanently attached to one of the two plate parts 60, 62. The inner part of this block is recessed as shown at 66 to fit the contour of the back of the human head and neck when the two parts of the block and of the supporting plate are brought together. This contoured recess is made larger than the normal back part of the human head and neck and is lined thickly, as shown at 68, with a soft material such as foam rubber which follows the shape of the recess 66 and which itself presents a recess contoured to receive the back of the head and neck of a person on the stretcher. The upper or outer part of each of the parts of the head mould block is arched, as shown at 70, so that the entire block conforms to the rounded shape of the top of the head of the usual person and this arcuate part of the block is closely surrounded by and held in place by the two parts of an up-standing wall 72, each of which is connected to and extends normally to the flat outer surface of one of the supporting plate parts and has an inwardly or downwardly extending flange 74 which overlies the edge part of the head mould block 64.

The size and shape of the contour recess 66 in the head mould block are such that the top part of the recess firmly receives the back and sides of the head, the lower or inner part of the recess firmly receives the back of the neck, and the side walls of the recess firmly engage the cheeks of the patient, thereby firmly holding these parts of the head and neck.

Means are provided by the invention to co-operate with the contoured recess in the head mould block to hold the upper front part of the patient's head and thereby further immobilize the head and neck. Such means comprise a hollow quarter-spherical head piece 80, the semi-circular

rear wall 82 of which is of such size and shape that it corresponds to the edge of the flange 74 which extends from the supporting plate and surrounds the upper part of the head mould block. From this rear wall the head piece extends forwardly and downwardly in a position in which it overlies the upper, forward part of the head of the patient, including the forehead, and extends downwardly to approximately the eyebrow level. This head piece is provided interiorly with a lining of foam rubber 84, and the size of the head piece is such that when it is in place and the inner surface of the foam rubber lining firmly engages the forward and upper part of the patient's head. A plurality of trunk latches 90 are provided for releasably attaching the head piece to the plate 72 which forms a fixed part of the supporting structure, and each of these has its two parts mounted, respectively, on the plate 72 and the head piece 80. Four such latches are shown in the drawings and as they are conventional and well known in structure and operation they need not be further described here.

Means are provided by the invention for shielding the eyes and the lower part of the face of a patient supported on the stretcher, and such means comprise a substantially semi-circular open wire face guard 100. In the embodiment of the invention being described this face guard comprises horizontal upper and lower wires or rods 102, 104 connected by vertical pieces 106 and being of such vertical size as to cover the lower part of the face, from the eyebrows downwardly. At each side of the supporting plate formed by parts 60, 62 there is provided an up-standing or forwardly extending wall, these being shown at 106, 108, and to the outer surface of each of these walls there is permanently attached a pair of blocks 110, 112 each having an opening in the forwardly facing surface thereof and within which four openings the four ends of the two horizontal wires of the face guard may be inserted in order to support the face guard on the supporting plate and beneath the lower edge of the head piece. A plate 114 extends between the upper and lower wires of the face guard at each side thereof and receives a thumb screw 116 by which the face guard may be locked in place by screwing the thumb screws against the outer surfaces of the two side walls 106, 108.

Means are provided by the invention for rigidly connecting the two pivoted halves of the splint-stretcher after they have been brought together into parallel relation. Such means comprise two small steel blocks 120, 122 which are mounted respectively on the two stretcher halves and each of which has a semi-circular machined groove therein. A supporting and connecting rod 124 is associated with these grooved blocks and has at each of its ends a cylindrical head 126 having the same shape as the grooves in the blocks whereby when the heads on the rod are positioned within the grooves in the blocks the two halves of the stretcher will be rigidly held together but may be released for separation by removing the connecting rod.

Means are also provided by the invention for hoisting and lowering the stretcher when it is in a vertical position, and such means comprise ears 130, 132 which are connected to the side walls of the supporting plate and are provided with openings which receive shackles 134 to which a hoisting cable may be attached.

Means are provided by the invention for supporting on the stretcher the body of an immobilized person when the stretcher is in a vertical position, such as it would when being raised or lowered through a small hatch in a space capsule, diving bell or the like. Such means comprise the two foot plates 140, 142 which are rigidly connected, respectively, to the two halves of the stretcher at the foot ends thereof, which is the end remote from that at which the head and neck receiving device described above is located. Each foot plate is rigidly attached to its stretcher part and each extends outwardly therefrom in a direction normal thereto to receive and support the foot

of the patient on the stretcher, and each has a substantially flat upper surface on which the two foot plates may receive the patient's feet.

As stated above, the means provided by this invention for receiving the head of a patient on a stretcher and maintaining the head and neck in fixed position are useful with any type of stretcher and not only with stretchers of the splint-stretcher type, in connection with which the invention is described above. The application of the means provided by the invention to a stretcher of the conventional fixed type is illustrated in FIG. 6 of the drawings, in which there are disclosed the side members 150, 152 which extend longitudinally of the stretcher and provide handles at each end thereof by which the stretcher may be carried. A body supporting member 154 of generally flat configuration is attached to these longitudinal side members and may be formed of either rigid or flexible material to provide a surface on which the body of a patient may be carried either in a horizontal position, as when the stretcher is carried by the handles at the ends of the longitudinal members 150, 152, or when the stretcher is hoisted in a vertical position by cables attached to the eye members 156, 158 which are rigidly attached to some part of the stretcher at the head end thereof. It will be apparent that the stretcher disclosed in FIG. 6 and now being described is of conventional construction but not of the splint-stretcher type.

The means provided by the invention for receiving and holding the head and neck of the patient are fully described hereinbefore and need not be again described in detail in connection with the embodiment disclosed in FIG. 6. However, it will be seen that these parts comprise the substantially flat plate 160 which is supported by and preferably secured to the body supporting member 154 at the head end of the stretcher and on the upper surface thereof, and on which are supported and carried all of the parts of the head receiving and holding means described hereinbefore, excepting only the steel blocks 120, 122 and the supporting and connecting rod 124 which are not required here because the fixed type of stretcher removes the necessity for holding together the parts of the head receiving means. In this embodiment of the invention those parts of the head receiving and holding means, which in the embodiment disclosed in FIGS. 1 to 5 were described as being formed in two parts in order to permit the scissors-like operation of the splint-stretcher, are formed as unitary members as the stretcher with which they are associated is fixed or unitary in construction and is not of the splint-stretcher type. In all other respects the parts forming this embodiment of the invention, including the foot plates, are identical with those described in connection with FIGS. 1 to 5.

While I have described and illustrated certain forms which my invention may take, it will be apparent to those skilled in the arts to which it relates that other embodiments, as well as modifications of those disclosed, may be made and practiced without departing in any way from the spirit or scope of the invention, for the limits of which reference must be made to the appended claims.

What is claimed is:

1. A stretcher for use in lifting the body of an immobilized person, comprising an elongated member constructed and adapted to be positioned under the body, a head receiving member at the head end of the stretcher comprising a head mould support formed of a rigid plate which is connected to an end part of the body supporting member and which forms a substantially continuous sur-

face at the head end of the stretcher, a head mould member comprising a block of substantially rigid material which is mounted on the front surface of the head mould support plate and which is hollowed out to the contour of the shape of the back of the head and neck of a human being, a soft lining for said head mould including the contoured part thereof, a substantially rigid hollow head piece of quarter-spherical shape constructed and adapted to be mounted on the head mould member in position to co-operate with the contoured part of the head mould to enclose the upper front part of the head of the immobilized person, and means for releaseably mounting the head piece on the head mould in such co-operating position.

2. A splint stretcher according to claim 1, comprising in addition a rigid foot plate mounted on each side frame member at the extremity of the foot end of the stretcher, each of said foot plates having an upper surface extending substantially at right angles to the longitudinal length of the stretcher and being adapted to receive the foot of an immobilized person on the stretcher and to support his body when the stretcher is in vertical or inclined position with the foot end downward.

3. A splint stretcher according to claim 1, comprising in addition a wire face guard of generally arcuate shape adapted to be positioned below the lower semi-circular edge of the head piece, and means for releaseably attaching the face guard in such position on the head mould support.

4. A splint stretcher particularly for use in vertically lifting the body of an immobilized person, comprising two elongated substantially identical side frame members constructed and adapted to be positioned along and under the opposite longitudinal sides of the body, means pivotally connecting said side frame members at at least the head end of the stretcher, a head receiving member at the head end of the stretcher comprising a head mould support formed of two rigid plates each of which is rigidly connected to an end part of one of the frame members and which together form a substantially flat continuous surface at the front of the stretcher when the side frame members are brought together in parallel relation, a head mould member comprising a two-part block of substantially rigid material each part of which is mounted on the front surface of one of the plates of the head mould support and which two parts are jointly contoured to the shape of the back of the head and neck of a human being, and a soft lining for said head mould member including the contoured part thereof.

5. A splint stretcher according to claim 4, comprising in addition a hollow head piece of quarter-spherical shape constructed and adapted to be mounted on the head mould support in position to cooperate with the contoured part of the head mould to enclose the upper front of the head of the immobilized person when the parts of the head mould are brought together, and means for releaseably mounting the head piece on the head mould support in such cooperating position.

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CASMIR A. NUNBERG, *Primary Examiner*.