

June 13, 1950

R. C. HUGHES

2,511,061

STRETCHER

Filed Jan. 29, 1945

3 Sheets-Sheet 1

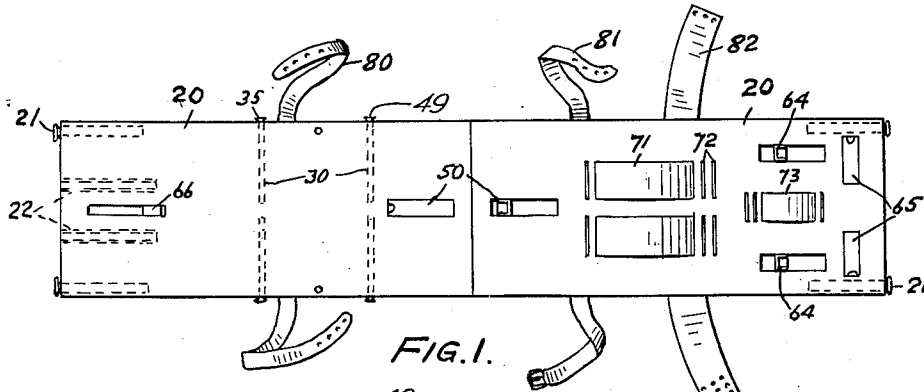


FIG. 1.

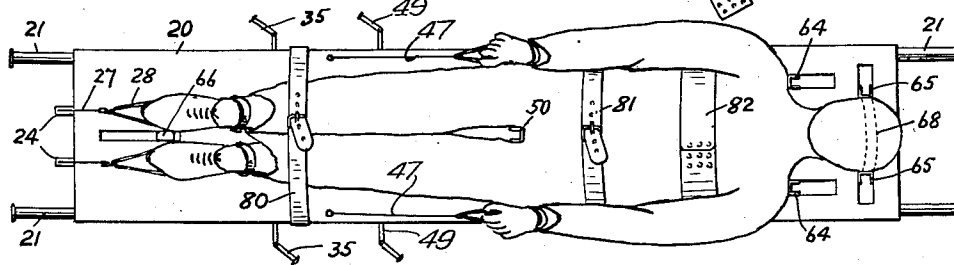


FIG. 2.

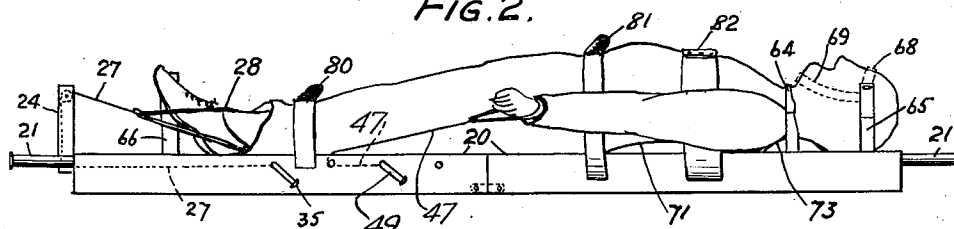


FIG. 3.

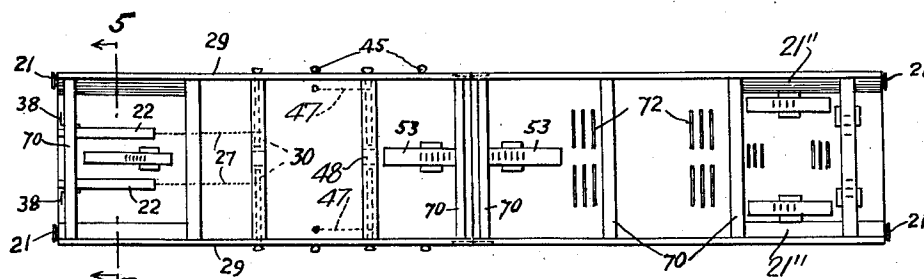


FIG. 4.

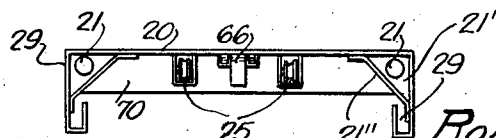


FIG. 5.

WITNESS:
Pat. Satchel.

INVENTOR

Robert C. Hughes
BY

Bussler and Harding
Attorneys

June 13, 1950

R. C. HUGHES

2,511,061

STRETCHER

Filed Jan. 29, 1945

3 Sheets-Sheet 2

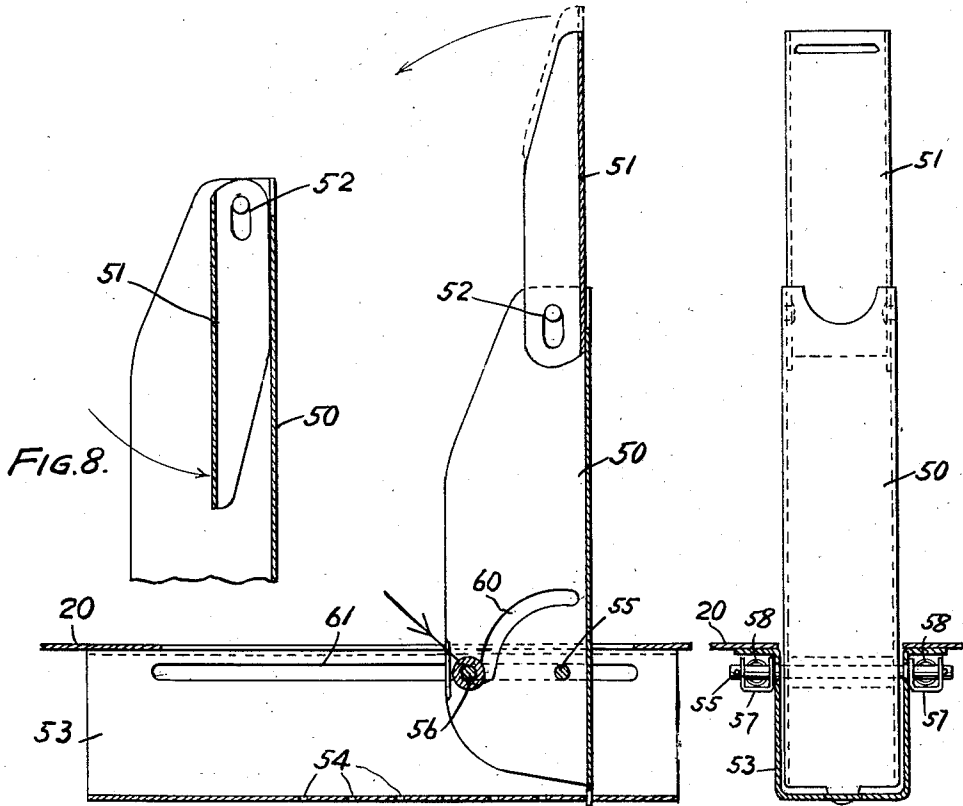


FIG. 6.

FIG. 7.

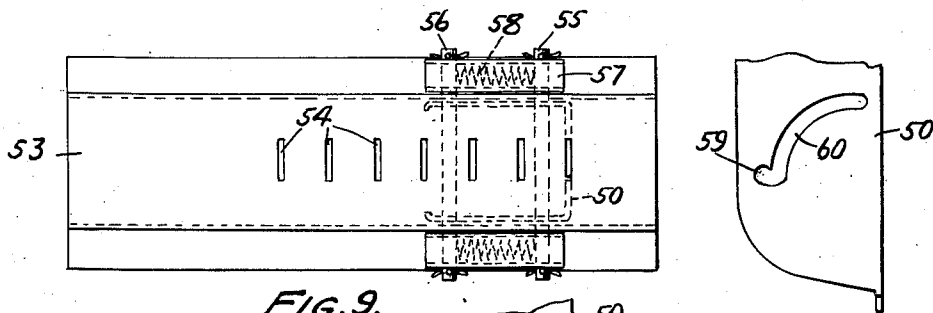


FIG. 9.

FIG. 6A.

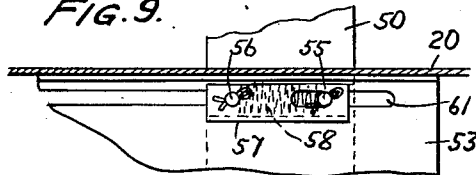


FIG. 10.

INVENTOR

WITNESS:

Robt. R. Kitchel

Robert C. Hughes
BY

Bussor and Harding
ATTORNEYS.

June 13, 1950

R. C. HUGHES
STRETCHER

2,511,061

Filed Jan. 29, 1945

3 Sheets-Sheet 3

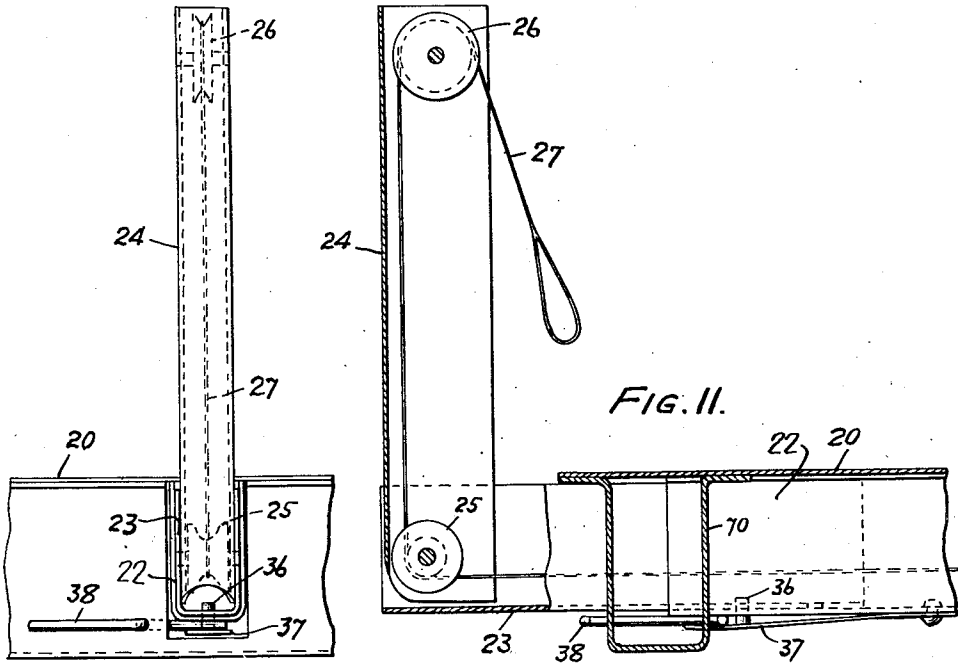


FIG. 12.

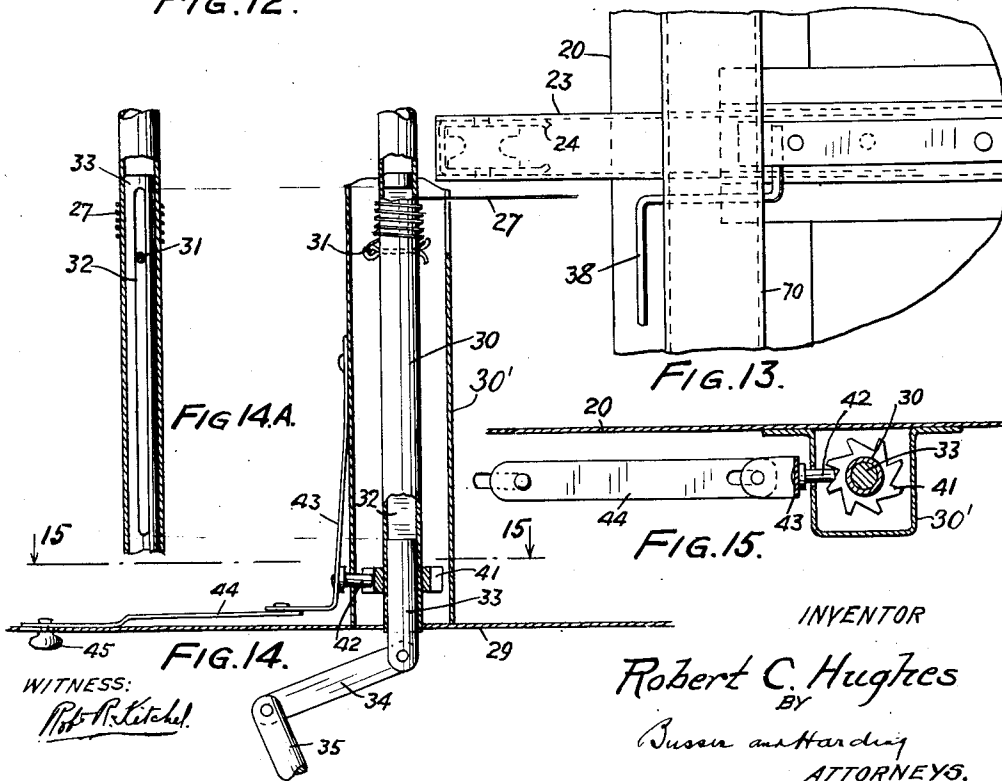


FIG. 14A.

FIG. 13.

FIG. 15.

WITNESS:
Robt. R. Kitchel.

INVENTOR

Robert C. Hughes
BY
Bussen and Harding
ATTORNEYS.

UNITED STATES PATENT OFFICE

2,511,061

STRETCHER

Robert C. Hughes, Paoli, Pa.

Application January 29, 1945, Serial No. 575,052

5 Claims. (Cl. 5—82)

1

In case of accident to the human body, and particularly any accident characterized by broken bones, it is always important, and often of vital importance, to prevent any additional injury to the body in the course of transportation from the locus of the accident to a hospital or hospital base. In the case of broken bones, any serious displacement, before hospital treatment, beyond that produced by the accident itself, often produces conditions that make the remedial measures of the physician or surgeon more difficult and may, in some cases, prevent completely successful bodily repair. Indeed, in some cases, fatal outcomes arise not from the inherently serious character of the bodily injury, but from secondary injuries incurred during transport of the injured body. This is particularly true, although not altogether limited to, a broken bone in the spinal column.

The best insurance against such secondary injuries is to maintain the injured members in a rigid position relative to the remainder of the body; and the most effective insurance against any disturbance of such rigidity is to maintain the entire body in a rigid condition as a unit. Jolts, jars and other irregular movements of the carrier or stretcher during transport are usually unavoidable; but if the body is maintained rigid as a unit, the danger from such movements during travel from place to place is minimized. The necessity for maintaining rigidity of the body, between the place of accident and that of the application of remedial measures, is particularly essential in the case of the breakage of bones in the spinal column without involvement of injury to the spinal cord. Any deviation from rigidity following the accident is attended with danger of injury to the spinal cord and consequent paralysis or death.

The object of my invention is to provide a stretcher which includes equipment whereby the entire body, after careful deposit on the carrier or stretcher, may be readily and quickly secured thereto in such a manner as to insure, not only that the body will be maintained in fixed position on the carrier or stretcher, but also that all parts of the body will be maintained in fixed relative positions until the hospital base is reached. Incidentally, my improved stretcher is adapted to maintain a broken leg or arm in fixed position relative to the body trunk, even though the equipment is not so manipulated as to hold the entire body rigid; but a primary advantage of the invention is its adaptability to guard against all secondary injuries where conditions make it difficult

2

or impossible to correctly or completely diagnose the character or extent of the injuries at the locus of the accident.

A stretcher effective to accomplish the above purposes is disclosed in an application filed by me December 29, 1942, Serial No. 470,429, which has matured into Patent 2,377,440, issued June 12, 1945. The stretcher forming the subject matter of the present invention embodies certain features of the invention of said application but embodies also numerous improvements therein. The principal improvements are intended and adapted to provide a more flexible structure whereby the stretcher may be adjusted in various ways to fit human bodies of different sizes and regardless of variations in the relative lengths of the arms, legs and chest. The invention also has for its purpose to provide a stretcher the adjustable elements of which may be readily and quickly manipulated. The invention also has for its object to provide a stretcher which is of maximum strength and durability. These and other advantages of the invention will be fully understood by reference to the following description and the annexed drawings, which disclose a preferred embodiment of the invention. In the drawings:

Fig. 1 is a plan view of the stretcher.

Fig. 2 is a similar view showing a representation thereon of a human body, with the various elements adjusted to hold the body in rigid relation to the stretcher.

Fig. 3 is a side view of Fig. 1.

Fig. 4 is an inverted plan view of Fig. 1.

Fig. 5 is a cross-section on the line 5—5 of Fig. 4.

Fig. 6 is a detail side view, partly in section, of one of the arms for engaging the crotch, shoulder or head of the body and of its connections with the baseboard.

Fig. 6A is a detail view of part of the arm of Fig. 6.

Fig. 7 is an end view, partly in section, of Fig. 6.

Fig. 8 is a side view, partly in section, of part of the arm of Fig. 6.

Fig. 9 is a bottom plan view of the connections between the baseboard and the arm of Fig. 6.

Fig. 10 is a side view, partly in section, of the parts shown in Fig. 9.

Fig. 11 is a detail side view, partly in section, of part of the mechanism for imposing tension upon, and holding rigid, the arms and legs.

Fig. 12 is an end view, partly in section, of Fig. 11.

3

Fig. 13 is a bottom plan view partially in section of Fig. 11.

Fig. 14 is a plan view, partly in section, of mechanism cooperating with that shown in Figs. 11, 12 and 13 for imposing tension upon, and holding rigid, the arms and legs.

Fig. 14A is a view, partly in section, of part of Fig. 14, at right angles thereto.

Fig. 15 is a plan view partially in section of the pawl and ratchet means for holding the mechanism of Figs. 12-14 in adjusted position.

The baseboard of the stretcher made of metal preferably comprises two sections 20, 20 hinged at the center to allow the sections to be folded one upon the other, so that, when not in use, the stretcher may be more compact and thereby facilitate handling and transportation. The ends of the stretcher are provided with corner brackets 21' having openings therein through which are inserted bars 21, which may be withdrawn, as shown in Fig. 2, to form hand bars for carrying the stretcher and the body deposited thereon. These brackets 21' are encased with a sheet metal covering 21'', as shown in Fig. 4.

One essential feature of the invention is to provide means for imposing tension on the legs or arms, or any of them, so that the body may be held rigid. Referring first to the means for imposing tension on the legs: Secured to the bottom of the baseboard are troughs 22, 22, in each of which is a slidable bar 23, having pivoted thereto, at its outer end, a lever 24 carrying, at its pivot, a pulley 25 and at its outer end a pulley 26. A cord, rope, wire, or other flexible connection 27 is provided at one end with a hitch 28 securable to a leg at the ankle and extending over the pulleys 26 and 25 and thence having several turns around a rotatable tube 30 extending between the side flanges 29 on the under side of the baseboard 20 within a casing 30', extending from one flange 29 to the other. By turning the tube 30 and thus winding the cord 27 around the tube, any desired tension may be imposed upon the leg.

The end of the cord 27 is secured to a cotter pin 31, Fig. 14, which extends through the opposite walls of the tube 30 and through a longitudinal slot 32 in a shaft 33 in the tube 30, see Fig. 14A. The outer end of this shaft 33 is connected by a link 34 with a handle 35, the same forming a crank by means of which the shaft 33 may be turned and thereby wind the cord 27 upon the tube 30.

The lever 24 may be swung on its axis into alignment with the trough 22 and bar 23 slidable therein to permit the lever 24 to be pushed into the trough when the stretcher is not in use. When the lever 24 is withdrawn, and the bar 23 partly withdrawn, from this trough 22, a pin 36, carried by a leaf spring 37, snaps into a hole in the bar 23 and holds the bar in that position, as shown in Fig. 11. When the lever 24 is swung down into alignment with the bar 23 and trough 22, pressure upon a lever 38 will retract the spring 37 and pin 36 from locking position, permitting the bar 23 and lever 24 to be pushed into the trough 22.

The cotter pin and slot connection between the tube 30 and shaft 33, as shown in Figs. 14 and 14A, permits the shaft 33 to slide within the tube 30 when the link 34 and handle 35 are brought into axial alignment with the shaft 33. Except when operating the shaft 33, tube 30 and cord 27 to impose tension on the leg, as hereinbefore described, the handle 35 and link 34 are moved into alignment with the shaft 33 and the

4

shaft, with the link and handle, are moved forward, within the tube 30, so as to avoid projection of any of this mechanism substantially beyond the side of the baseboard.

To retain the tube 30 in the position to which it is turned there is provided a ratchet 41 fixed to tube 30 engageable by a pawl 42, as shown in Figs. 14 and 15. The pawl 42 is carried by a leaf spring 43 which maintains the pawl in engagement with the ratchet. The leaf spring is operable to release the pawl by means of a slidable rod 44 having a hand operable knob 45.

Tension may be imposed upon the arms by mechanism the same as that above described for imposing tension upon the legs. It is only necessary, therefore, to illustrate the main elements of this mechanism, namely: the cord 47, the tube 48, and the crank shaft 49.

Maintenance of the rigidity of body requires the provision of a member adapted to engage the crotch at the junction of the legs with the body. It is also desirable that this member be adjustable along the baseboard to enable proper engagement with bodies of different lengths. To effect this purpose the mechanism shown in Figs. 6-10 is provided. The crotch-engaging member comprises a trough-shaped arm 50, to which is secured, by a pin and slot connection 52, a trough-shaped lever 51, which, in the position shown in Figs. 6 and 7, telescopically engages the inner face of the arm 50 and is held in parallelism with, and constitutes an extension of, the arm 50, but when it is moved outward to a position where the web of lever 51 can pass beyond the web of arm 50, the lever 51 is then swingable into the position shown in Fig. 8, to thereby shorten the arm 50 so that the arm may be swung into parallelism with the baseboard, as hereinafter described, when the stretcher is not in use.

Secured to the baseboard and extending longitudinally of the center thereof are troughs 53, 53, each having a series of cross slots 54, with any one of which a projection from the lower edge of an arm 50 is adapted to engage. There are, in fact, two of these arms 50, one for each trough 53. Extending between and through the side members of each trough 53 are a pair of pins 55, 56, which, outside the side members of each trough 53, carry channel bars 57 holding springs 58 located between pins 55 and 56. Pins 55 are secured to the side members of the arm 50. Pins 56 are normally held by the springs 58 in recesses 59 at the end of arcuate slots 60 in the side members of the arm 50 when the arms are raised as shown in Fig. 6. The pins 55 and 56 are slidable in slots 61 in the sides of the trough 53, so that each arm 50 may slide along its corresponding trough 53 into position to engage any of the notches 54 therein. In order to release the arm 50 from engagement with the trough 53 the pin 56 is pressed by hand in approximately the direction of the arrow, Fig. 6, to force it out of the recess 59 into the lower end of the arcuate slot 60. The arm is then free to swing to the left, Fig. 6, until it extends horizontally within the trough 53 and flush with the base. Before so swinging the arm 50 into this position, its extension 51 is moved out from the full line position shown in Fig. 6 to the dotted line position shown in the same figure and is swung down into the position shown in Fig. 8.

A similar construction is applied to arms 64 adapted to engage the shoulders, to arms 65 adapted to engage the sides of the head, and

5

to arm 66 adapted to be positioned between the feet; these arms being shown in Figs. 1-4.

A number of reinforcing channels 70 extend between the side flanges of the baseboard, and as the casings 30' for tubes 30 extend from one side flange to the other they will also act as reinforcing members.

As shown in my prior application, thin arched plates 71 extend longitudinally of the baseboard, the plates being adapted to underlie and firmly support the spinal column of the body recumbent on the baseboard. The plates are somewhat resilient and their ends are adapted to engage cross slots 72 in the baseboard so as to enable the plate to be adjusted to different longitudinal positions. Another similar arched plate 73, similarly engageable with notches in the baseboard, is provided for a neck-rest.

As disclosed in my prior application, the arms 65 adapted to engage opposite sides of the head of the body have secured thereto straps 68 and 69 adapted to respectively overlie the forehead, and underlie the chin.

Straps 80, 81 and 82 may be secured to the baseboard so as to be fastened in position over the legs and the chest.

No claim is made herein to the tensioning means herein disclosed, since features thereof deemed patentable, with certain improvements thereon, are described and claimed in a copending application, Serial No. 104,515, filed July 13, 1949.

What I claim and desire to protect by Letters Patent is:

1. A stretcher comprising a baseboard having a plurality of body engaging arms pivotally and adjustably mounted thereon, and arranged to be raised at an angle to the baseboard or folded into the plane of the baseboard, a support for each arm having side members connected to the bottom of the baseboard, coacting means between each arm and the side members of its support for pivotally and slidably connecting the arm to the baseboard to permit independent adjustment of the arms along the baseboard, and means associated with each arm for securing the arm in its adjusted and raised position.

2. A stretcher comprising a baseboard, a crotch holding arm located in the longitudinal center of the baseboard and intermediate the ends thereof, an arm at the lower end of the stretcher for supporting the feet, a pair of shoulder holding arms at the upper end of the baseboard at opposite sides of the longitudinal center, a pair of head holding arms above the shoulder holding arms, each of said arms being pivoted to a channel member secured to the underside of the baseboard to permit the arms to be folded into the channel member within the plane of the baseboard when not in use and to be raised into body holding position, and means associated with each arm for permitting independent adjustment of each arm on the baseboard and for retaining it in its raised and adjusted position for holding a human body on the baseboard.

3. A stretcher comprising a baseboard, a channel member connected to the bottom of the baseboard, each of the flanges of the channel member having a slot substantially parallel with the

6

baseboard, a body engaging arm having a portion within the channel member, a pivot pin extending from each side of the arm into the slot in the channel member at that side whereby the arm is arranged to be raised at an angle to the baseboard and moved to various positions along the channel member, and means for securing the arm in its adjusted position.

4. A stretcher comprising a baseboard, a channel member connected to the bottom of the baseboard, each of the flanges of the channel member having a slot substantially parallel with the baseboard, a body engaging arm of channel shape having a portion within the channel member, a pivot pin extending from each side of the arm into the slot in the channel member at that side whereby the arm is arranged to be raised at an angle to the baseboard and moved to various positions along the channel member, means for securing the arm in its adjusted position, and an extension member for the arm connected to the end thereof by a slot and pin connection whereby the extension can be moved outwardly over the pin, turned 180° and shifted back over the pin to position the extension within the arm.

5. A stretcher comprising a baseboard, a channel member connected to the bottom of the baseboard, each flange of the channel member having a slot parallel with the baseboard, the web of the channel member being provided with a plurality of transverse slots, a body engaging arm of channel shape within the channel member, a pivot pin and a supporting pin extending through the arm and the slots in the flanges of the channel member, a channel bar mounted on the pins at each side, a spring within each channel bar interposed between the pins urging them away from each other, there being an arcuate slot in each of the sides of the arm struck from the center of the pivot pin, there being an offset from one end of each arcuate slot in which the holding pin is seated when the arm is raised, and an extension on the end of the arm for engagement with the transverse slots in the web of the channel member for positioning the arm along the baseboard.

ROBERT C. HUGHES.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,452,915	Kennedy	Apr. 24, 1923
1,901,641	Goldblatt	Mar. 14, 1933
2,247,360	Clayton	July 1, 1941
2,312,742	Andersen	Mar. 2, 1943
2,373,456	Chapman	Apr. 10, 1945
2,377,940	Hughes	June 12, 1945

FOREIGN PATENTS

Number	Country	Date
25,710	Austria	Sept. 25, 1906
18,418	France	1914
(2nd edition of 450,339)		
50,579	Netherlands	June 16, 1941