April 22, 1958 D. R. LIMBACH 2,831,201

PATIENT LIFT AND TRANSPORT DEVICE

Filed June 3, 1954 2 Sheets-Sheet 1

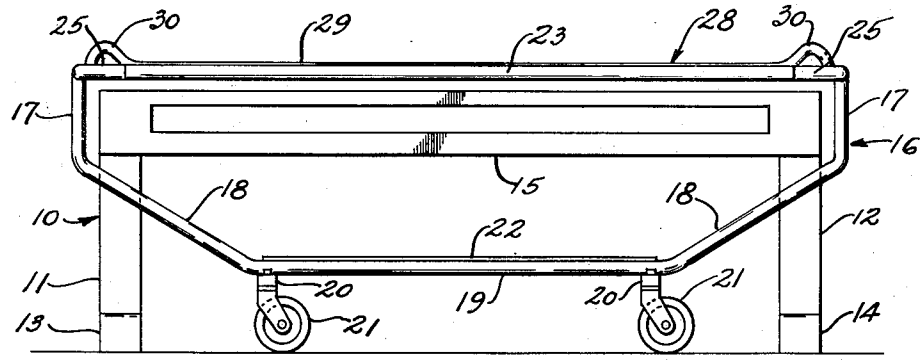


Fig. 1

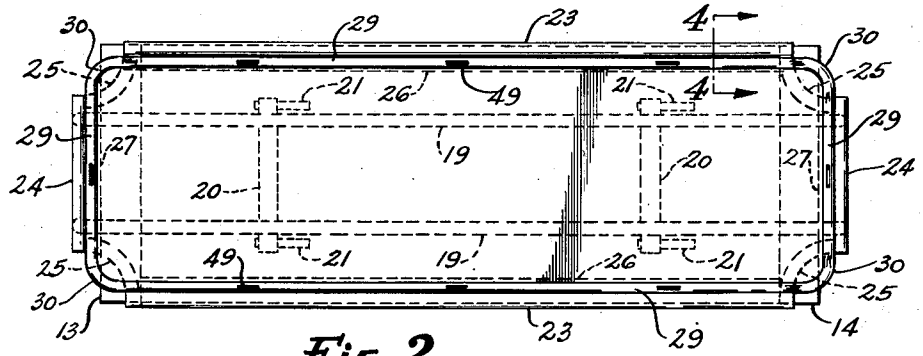


Fig. 2

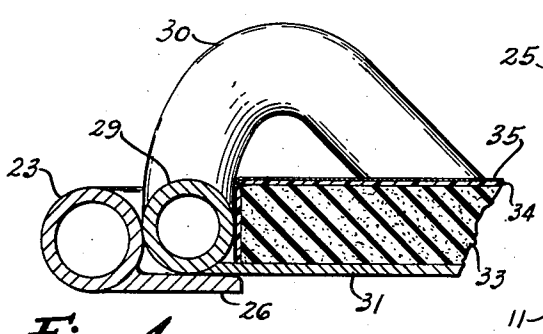


Fig. 4

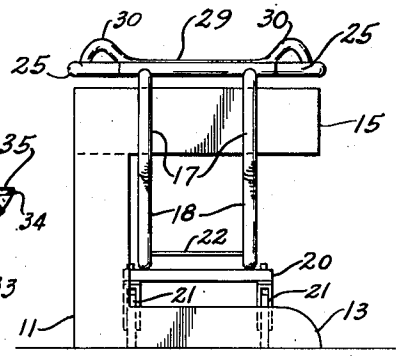


Fig. 3

INVENTOR.
DAVID R. LIMBACH

BY
Oberlin & Limbach

ATTORNEYS

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PATIENT LIFT AND TRANSPORT DEVICE

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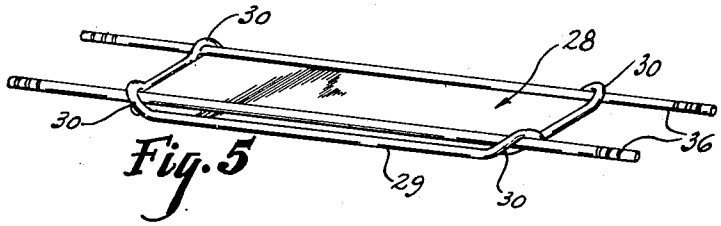


Fig. 5

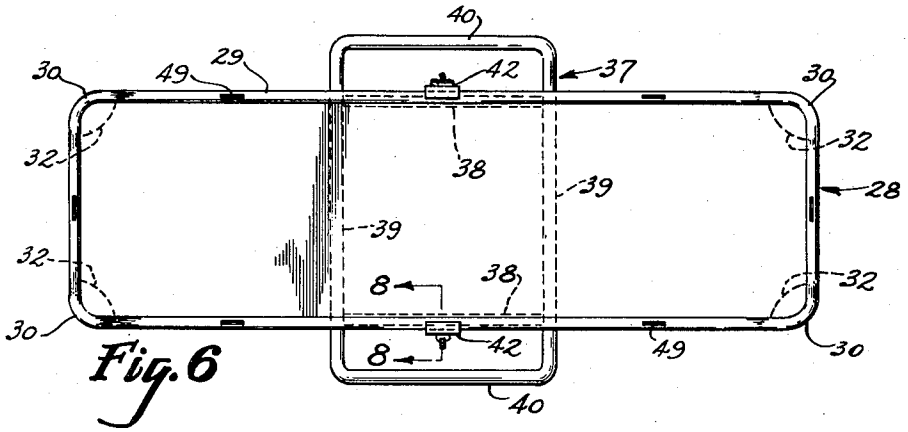


Fig. 6

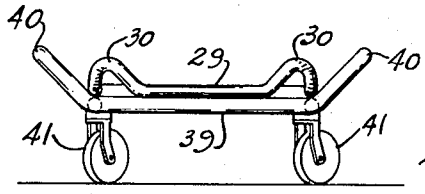


Fig. 7

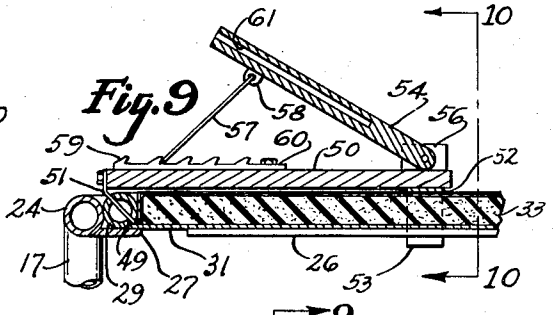


Fig. 9

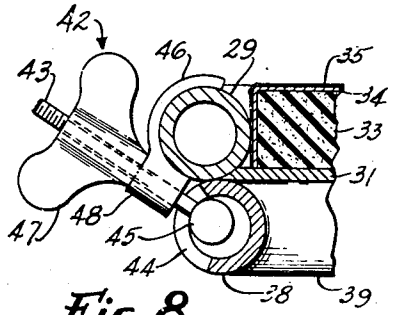


Fig. 8

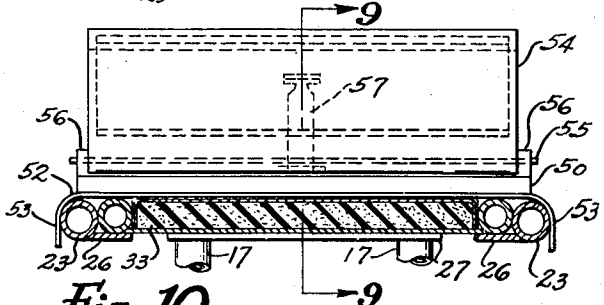


Fig. 10

INVENTOR.
DAVID R. LIMBACH

BY Oberlin & Limbach

ATTORNEYS

United States Patent Office

2,831,201

Patented Apr. 22, 1958

2,831,201

PATIENT LIFT AND TRANSPORT DEVICE

David R. Limbach, Fenton, Mich.

Application June 3, 1954, Serial No. 434,163

1 Claim. (Cl. 5—82)

This application is a continuation-in-part of my copending application, Serial No. 352,736, filed May 4, 1953, now Patent No. 2,681,839, granted June 22, 1954, and relates, as does the latter, to improvements in devices used to transport the injured.

In such prior application I have disclosed a novel combination of a wheeled hospital carrier and an X-ray table, the two being functionally related so that the table may be used to take X-ray pictures of the patient while he is supported on the carrier. This prior construction thus eliminates the heretofore encountered necessity of transferring the patient to and from the X-ray table, in some instances, a considerable number of times in order to perfect the X-ray examination.

The problem of disturbing and possibly endangering a seriously injured patient by handling presents itself not only in the taking of X-ray pictures, but on many other occasions in the hospital and also in delivery of the injured person to the hospital. Whether brought by ambulance or another conveyance, it is, of course, necessary on arrival to lift and place the person on a hospital carrier, in many cases, without having determined definitely the nature and extent of the injury.

A primary object of my present invention is further to reduce the necessary handling of a patient by providing an improved hospital carrier having a removable stretcher top which can be used separately to lift and transport the patient in the usual manner of a litter. The stretcher body-supporting portion is preferably made of radiolucent material and the carriage or frame on which it is supported of the general construction shown in my application, Serial No. 352,736, now Patent No. 2,681,839, so that this carrier also may be used in combination with the X-ray table of said application for the taking of X-ray pictures without removal of the patient from the stretcher.

It is also an object of the invention to provide a stretcher of improved construction permitting the same to be used conveniently and efficiently to lift and transport an ill or injured person by manual carrying and readily to be attached to various mechanical lifts and conveyances.

Other objects and advantages will become apparent as the following description proceeds.

To the accomplishment of the foregoing and related ends, the invention, then, comprises the features hereinafter fully described and particularly pointed out in the claim, the following description and the annexed drawings setting forth in detail certain illustrative embodiments of the invention, these being indicative, however, of but a few of the various ways in which the principle of the invention may be employed.

In said annexed drawings:

Fig. 1 is a side elevational view of an improved carrier in accordance with the present invention, shown in operative relation with an X-ray table of the type

disclosed in my application, Serial No. 352,736, now Patent No. 2,681,839;

Fig. 2 is a top plan view of the Fig. 1 carrier and table;

Fig. 3 is an end view thereof;

Fig. 4 is a vertical section as viewed from the plane of line 4—4 in Fig. 2, looking in the direction of the arrows;

Fig. 5 is a perspective view of the stretcher top removed from the carriage or frame of the carrier and provided with stretcher poles;

Fig. 6 is a top plan view of the stretcher as supported by an ambulance carriage;

Fig. 7 is an end view of the Fig. 6 assembly;

Fig. 8 is a vertical section as viewed from the plane of line 8—8 in Fig. 6, looking in the direction of the arrows;

Fig. 9 is a sectional view, taken on the line 9—9 in Fig. 10, illustrating an adjustable back rest attached to the stretcher top, the latter being supported on the hospital carriage shown in Fig. 1; and

Fig. 10 is a transverse sectional view of the stretcher, looking toward the back rest as indicated by the line 10—10 in Fig. 9.

Referring now to the drawings in detail, the X-ray table, designated generally by reference numeral 10, is of the improved construction set forth in my aforesaid copending application. This structure comprises two rear legs 11 and 12, provided respectively with forwardly projecting feet 13 and 14 and supporting the top 15 of the table as a horizontally disposed cantilever.

The carrier, indicated generally at 16, is likewise similar to the carrier of such copending application insofar as the lower frame structure is concerned. The frame includes two spaced vertical leg portions 17 at each end thereof, inclined leg portions 18 extending inwardly from the lower ends of the vertical leg portions, and horizontal base portions 19 joining the respective pairs of the inclined leg portions. Approximately at the points of juncture between the inclined leg and base portions, cross-braces 20 are provided to stiffen the frame and serve as supports for wheels 21, one wheel being attached at each end portion of the two such braces. A platform or tray 22 is preferably supported by the base frame portions 19.

The dimensions of this lower frame are related to those of the X-ray table so that the downwardly inclined and horizontal base legs of the frame, including the wheels, are disposed beneath the top 15 of the table, while the vertical end legs 17 are disposed outwardly beyond the ends of the table. This functional relationship, of course, permits the frame to support a top in operative position over the table for the taking of X-ray pictures of a patient on such top. It is by virtue of this construction that the usual handling of the patient for X-ray examination is eliminated.

Considering now the top frame of the improved carrier, the same is generally of rectangular shape and comprises straight side members 23, end members 24, and an inwardly curved member 25 at each corner, all such members being connected together to form a continuous top frame disposed in a horizontal plane. Both the top and lower frames are preferably formed of continuous, chromed hollow tube or pipe. End pieces 24 are positioned on and secured to the vertical legs 17 at the respective ends of the lower frame to support the upper frame on the latter. At the inner lower side of the two side members 23 of the top frame, a horizontal, inwardly projecting flange 26 is suitably attached or otherwise pro-

vided, and each end member 24 is provided with a similar flange 27.

The carrier structure thus far described, including both top and bottom frames, constitutes the carriage on which the stretcher, designated generally by reference numeral 28 is removably supported. The stretcher is of general rectangular shape and comprises a peripheral tubular support 29, which is preferably made of a magnesium or other light metal alloy to reduce the weight. Each corner of this support is rounded and raised to form a hand grip 30 projecting upwardly from the plane of the stretcher. A platform 31 having curved cut-out corners, indicated at 32, is secured to the bottom of support 29 to occupy the space therewithin except for the corner regions. The platform is also preferably made of a magnesium alloy and positioned thereon is a pad comprising a radiolucent foam rubber body 33, an inner cover 34 of a water-proof radiolucent plastic material, and an outer fabric sheet or cover 35.

Both the width and the length of the stretcher are less than the corresponding dimensions of the top frame of the carriage by approximately the diameter of the side and end portions of the latter, so that the stretcher support 29 nests within the carriage frame and is supported on the carriage flanges 26 and 27. As shown most clearly in Fig. 4, the substantial nesting of the stretcher support 29 prevents the stretcher from being dislodged endwise or laterally. The upward curvature of each hand grip 30 clears the corner pieces 25 of the carriage and the grips are disposed for convenient access in the free corner spaces provided by the members 25. No separate fastening means need be employed to hold the stretcher in its described operative relation with the carriage, and it will be appreciated that the stretcher can very easily be removed when it is desired to transport the patient by other means, the patient remaining on the stretcher. A sleeve, not shown, of heavy radiolucent and semi-elastic fabric can be used in lieu of platform 31 and the pad thereon to support the patient by being stretched over frame 29 in the manner of an envelope, the corners of such sleeve being cut-out so as not to enclose the hand grips 30.

The ready removability and light weight of the stretcher permit it to be used very conveniently as a litter, carried by the hand grips, stretcher poles, straps, or other suitable means. Due to the fact that the raised stretcher corners forming the hand grips are rounded, it is possible to pass stretcher poles 36 through the openings of the grips at the respective sides, as shown in Figs. 5. The hand grips also permit the stretcher to be used as a sling, for example, in a helicopter pick-up, by passing a lifting cable through the grip openings.

The stretcher may also be used in an ambulance, and in Figs. 6 to 8 I have shown the stretcher in operative association with an ambulance stretcher carriage 37. This carriage, again of tubular construction, comprises a support frame including side sections 38 and transverse sections 39 adapted to be overlain by the stretcher, centrally positioned beneath the same. Upwardly extending hand rails 40 are provided at the sides of the carriage and the usual four swivel wheels 41 attached at the corner regions of the stretcher-supporting frame for the desired mobility.

In order to hold the stretcher firmly on this ambulance carriage, the side sections 38 of the same are provided with clamps 42 adapted to engage the stretcher sides. As shown clearly in Fig. 8, each clamp comprises a threaded stud 43 extending through a slot 44 in the carriage side 38 with which it is associated and having a swivel ball 45 at its inner end within such section. The stud is, accordingly, attached for swinging movement in the slot and slidably mounted thereon is a hook member 46, which engages about the stretcher support 29 in the clamping position. A wing nut 47 is threaded on the shaft outwardly of the hook collar portion 48 and may be tightened against such portion, so that the hook tightly engages the stretcher. The two clamps may readily be engaged with and released from the stretcher and in clamping condition firmly attach the stretcher to the carriage 37 for movement therewith.

The stretcher and carriage described afford what may be termed "a single stretcher system" for the delivery and emergency treatment of an injured person with an absolute minimum of handling and transfer. Assuming that such person is lying on the ground at the place of injury, at a substantial distance from the hospital, the stretcher may be placed alongside on the ground and the person placed thereon by a sliding movement with as little disturbance as possible. The stretcher may now be attached to the ambulance carriage and transported in the ambulance to the hospital. On arrival, the stretcher can be removed from the ambulance carriage and placed on a hospital carriage of my improved construction. Thereafter, the patient may be X-rayed and given emergency treatment until he is finally placed in bed. Throughout this delivery, examination, and treatment, the patient remains on the stretcher so that in a case of this nature only two relatively simple transfers, at the initial pick-up and eventual placement in bed, are necessary.

The stretcher is moreover adapted to receive various attachments, such as head rests, arm boards, restraint bands, solution bottle holders and the like, in a manner somewhat similar to the patient carrier disclosed in my application, Serial No. 352,736, now Patent No. 2,681,839. For this purpose, the tubular frame 29 of the stretcher is provided with a plurality of slots 49, three in each side and one in each end portion, for the reception of brackets carried by such attachments. All such slots of this nature extend outwardly relative to the stretcher at approximately a 45° angle, as shown in Fig. 9 wherein I have illustrated an adjustable back rest removably attached to the stretcher as the same is supported on the hospital carriage.

The back rest of Figs. 9 and 10 comprises a base 50 adapted to overlie an end portion of the stretcher and having an angular strap 51 at its outer end which fits within the slot 49 at such end. At its inner end the base is provided with a transverse strap 52 having downturned end portions 53 which engage about the side members 23 of the hospital carriage. The base had a body-supporting member 54 pivotally connected thereto at its inner end by means of a rod 55 extending between and supported by side uprights 56. A brace 57 is pivotally connected at 58 to the back of member 54 and is selectively engaged at its lower free end with the teeth 59 of latch bar 60 secured to the top surface of the base. The support member 54 may, therefore, be adjustably set at an inclination to the plane of the stretcher, thereby to elevate portions of the patient. Member 54 is provided with a recess 61 adapted to receive X-ray film and spring fingers, not shown, may be disposed on the opposite side walls of the recess to hold such film in place.

The other attachments mentioned would be provided with angle straps similar to the strap 51 and removably secured to the stretcher by engagement of such straps in one or more of the slots 49. Side boards, head rests, and the like, of course, facilitate the performance of emergency surgical procedures while the patient is supported on the stretcher. If desired, the stretcher could be removed from the hospital carriage and secured by suitable means to an ordinary surgical table. Likewise, the stretcher can be removed and secured to a tilting X-ray table or supported on a plain table for other procedures.

Other modes of applying the principle of the invention may be employed, change being made as regards the details described, provided the features stated in the following claim, or the equivalent of such, be employed.

I therefore particularly point out and distinctly claim as my invention:

A stretcher comprising a rigid rectangular frame, radiolucent patient-supporting means in the area enclosed by said frame and secured to the side and end portions thereof, and upwardly projecting handles at the respective corners of said frame, said handles being connected across the corners between the adjoining side and end frame portions, with the two handles at each longitudinal side of the frame being adapted to pass a carrying pole extended therethrough substantially parallel to the frame side and above the body of the stretcher.

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