Dec. 31, 1957 D. R. LIMBACH 2,818,315

ADJUSTABLE HOSPITAL CARRIAGE

Filed Oct. 31, 1955 2 Sheets-Sheet 1

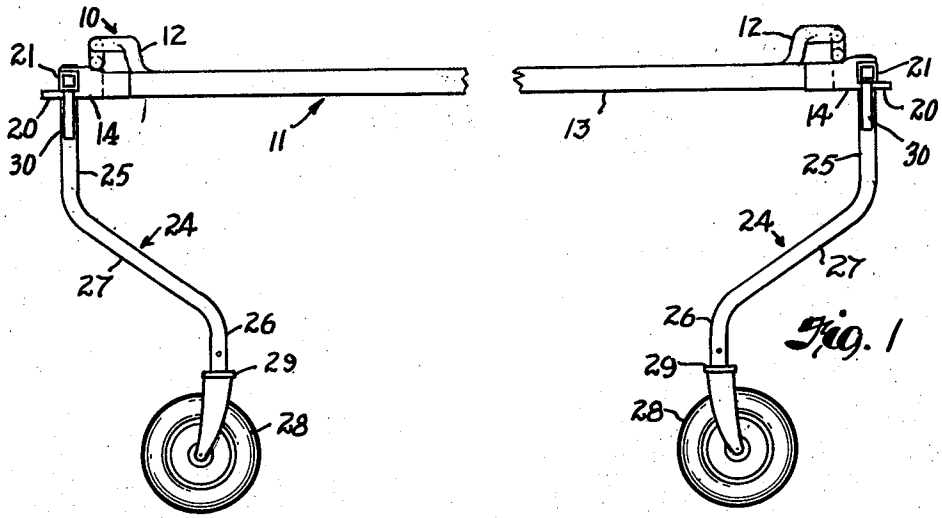

Fig. 1

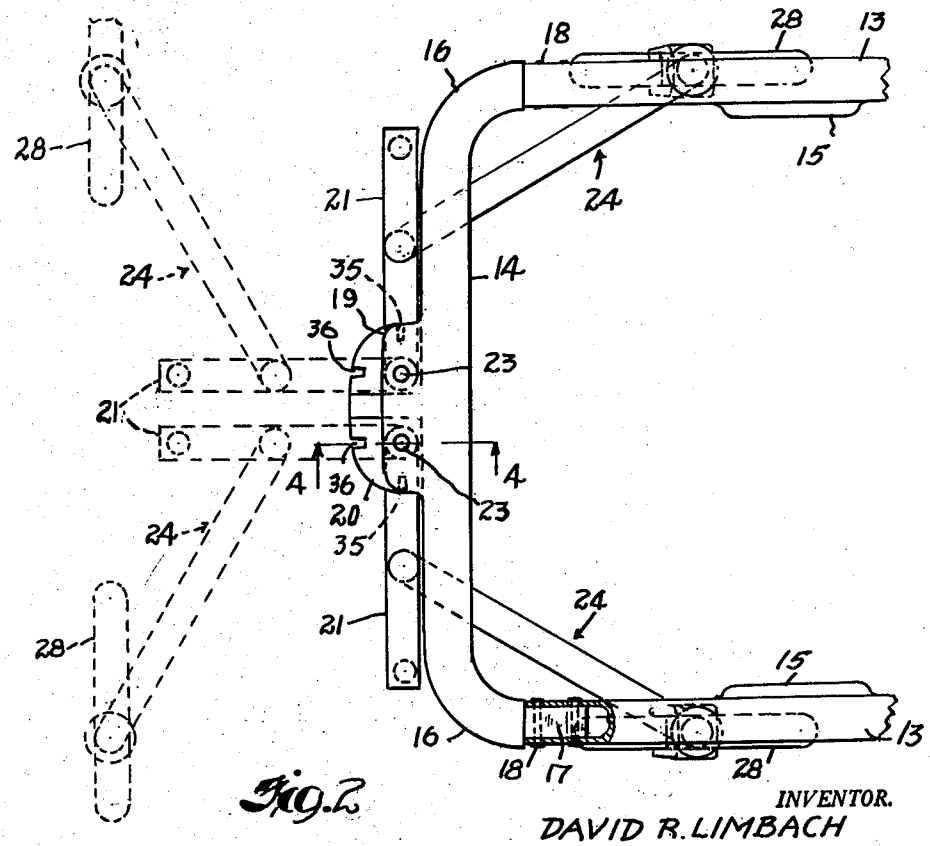

Fig. 2

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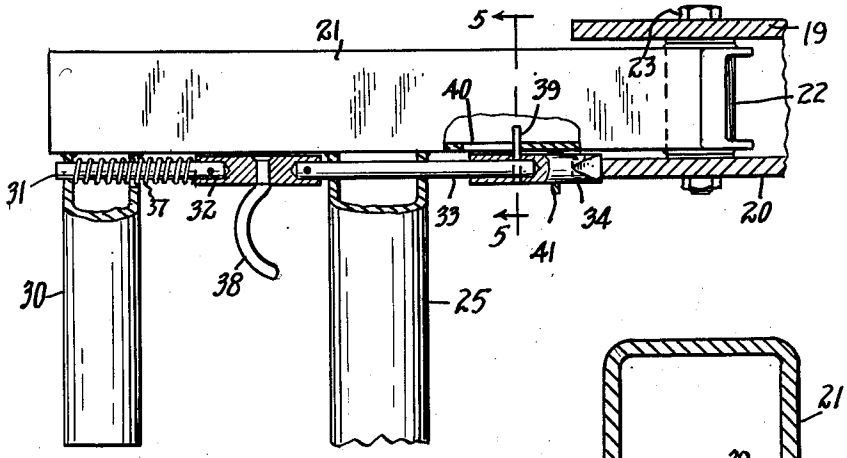

Fig. 3

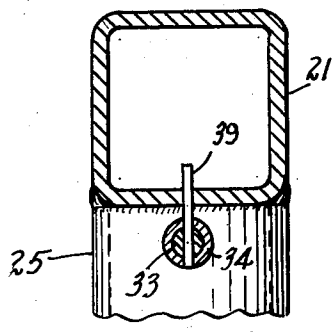

Fig. 5

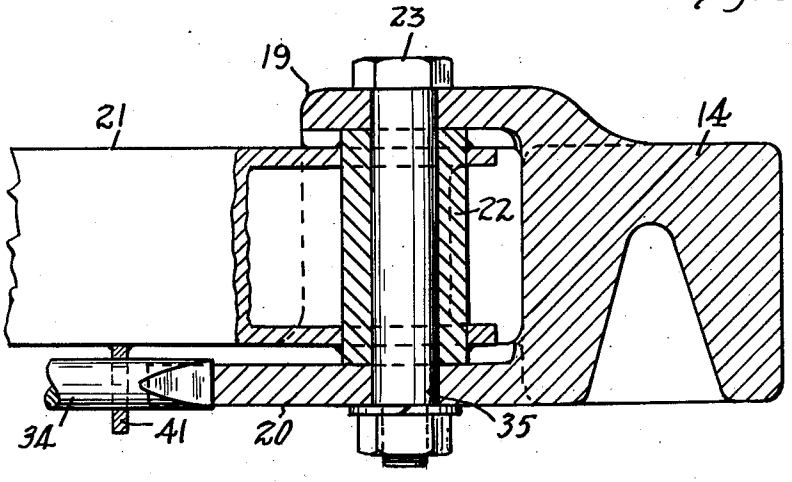

Fig. 4

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ADJUSTABLE HOSPITAL CARRIAGE

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Application October 31, 1955, Serial No. 543,897

3 Claims. (Cl. 311—5)

This invention relates, as indicated to carriages or carts used for patient transport within hospitals and, more particularly, the carriages of the type disclosed in my Patent No. 2,681,839, dated June 22, 1954, and in my co-pending application Serial No. 434,163, which was filed on June 3, 1954.

In such patent, I have disclosed a hospital carriage and an X-ray table of such interrelated construction as to permit the two to be brought together for the taking of X-ray pictures of a patient supported on the carriage or cart. The top of the table is supported as a cantilever, with L-shaped legs at the rear edge only, while the carriage frame is designed functionally to be nested with the table, that is, the carriage may be moved on the table to position the top of the latter beneath the patient-carrying carriage top. Such carriage top is made of radiolucent material, to permit penetration of the X-rays, and it will be clear that this combination eliminated the prior need for physical transfer of a patient between conventional carriers and X-ray equipment.

Reducing the handling of a patient, particularly in emergency cases, to a minimum, has been my primary objective in this work, and in said co-pending application, I have described and claimed a modified carriage having a removable stretcher top which can be used separately to lift and transport an injured or ill person in the usual manner of a litter. This particular improvement has made it possible to pick up a patient at the place of an accident or the like on the detached stretcher top, deliver him to the hospital where the top with the person thereon is placed on the carriage frame, take X-ray pictures, and perform needed emergency treatment, all without any further physical transfer until the patient is ready to be placed in a hospital bed.

These previous developments have been applied in actual hospital procedures and have been well-received. It is now my intention to increase the flexibility, in a functional sense, of the carriage to the principal end of adapting the same for such use with X-ray tables of varying types and sizes.

With my new carriage construction to be disclosed herein, the taking of X-ray pictures can be accomplished without transfer of the patient with pedestal type X-ray tables, as well as with the cantilever type of table discussed.

It is another object of the present invention to provide a new carriage having legs which are adjustable in such manner as to afford greater clearance than normally obtaining beneath the carriage top, when such added clearance or spreading of the legs is desired or necessary.

A further object is to provide such a carriage in which the wheel-bearing legs are normally tucked beneath the carriage top for enhanced maneuverability, but may be extended outwardly to increase the spacing between the legs at the respective ends of the carriage.

It is also an object of the invention to provide a carriage equipped with such adjustable legs wherein the legs are bodily shifted outwardly of the respective ends of

the carriage frame, as distinguished from an adjustment whereby only the lower end spacing or the angle of inclination of the legs is varied. My adjustment, moreover, does not disturb the elevation of the cariage top.

An additional object is to provide a carriage having legs capable of such adjustment in which reliable and conveniently operable latch mechanism is included for locking the legs selectively in various conditions of adjustment.

Other objects and advantages of the invention will appear 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 claims, 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 elevation on my new hospital carriage, which has been broken longitudinally for convenience of illustration;

Fig. 2 is a top plan view of one end of the carriage frame showing different operating positions of the legs at such end in full and dashed lines;

Fig. 3 is an elevational view, partly in section, of one of the connecting assemblies used to secure the legs to the frame;

Fig. 4 is a transverse sectional view taken on the plane of the line 4—4 in Fig. 2 with the arm depicted in extended condition; and

Fig. 5 is a section as viewed from the plane of the line 5—5 in Fig. 3.

Referring now to the drawings in detail, the carriage shown in Fig. 1 comprises a stretcher top designated generally by reference numeral 10 and a frame indicated at 11 on which the top is removably supported. Such top is constructed in the manner set forth at length in my co-pending application Serial No. 434,163, and reference may be had thereto for such details as are not specifically mentioned in the present disclosure.

It is believed sufficient here to point out that the stretcher top includes a peripheral frame, preferably made of light metal tubing, having raised and angularly disposed corners 12 which serve as hand-holds and also as projections through which stretcher poles may be passed. Within this frame, there is a body-supporting platform and on the same a suitable pad may be disposed, both the platform and pad having such composition as to pass X-rays therethrough. As discussed above, the top is formed separately of the carriage frame and may be removed therefrom for use as a litter outside of the hospital.

The carriage frame 11 comprises a rectangular open top made up of side pieces 13 and end sections 14 permanently joined thereto. Such parts are horizontally disposed and likewise preferably made of light metal, for example, aluminum, magnesium alloy, etc., with the sides 13 in the form of square tubing and the ends 14 cast from such metal. The length and width of this carriage top are slightly greater than the corresponding dimensions of the stretcher frame, so that the latter can nest closely within the former. A suitable number of projections 15 are provided to extend inwardly from the bottoms of the side members 13 and thus support the stretcher on the carriage. This arrangement affords an excellent joining of the two and, at the same time, permits the stretcher top to be readily lifted and removed from the carriage frame.

Each end member 14 is of the fluted sectional shape shown in Fig. 5 over its major extent and has curved end

portions 16 which terminate in slightly reduced end blocks 17. Such blocks fit within the respectively adjacent ends of the two side pieces 13 and are attached to the same by rivets 18. Outwardly projecting upper and lower plates 19 and 20, respectively, are formed centrally of the transverse extent of the end member, in the manner of a fork mounting, with the lower plate having a greater projection.

A section of square tubing forming an arm or link 21 and having a bearing column 22 at one end is pivotally jointed to the plates 19 and 20 at each side of such assembly. The plates have two sets of vertically aligned holes in registry respectively with the bearing columns 22 of the two arms, and bolts 23 passed through such openings secure the arms between the plates, and hence to the frame end member, for horizontal swinging movement. As shown in Fig. 2, the arms are normally disposed parallel to the frame end, and in such condition they do not extend beyond the frame sides.

Secured to the bottom of each arm 21 at a point spaced outwardly from the pivotal connection thereof to the frame is a depending leg 24, preferably made of stainless steel tubing and attached to the arm by welding. The legs in the embodiment illustrated have generally parallel, off-set upper and lower portions 25 and 26 and an angular intermediate portion 27, the several portions being integral and the junctures of the same being smoothly curved. A ground-engaging wheel 28 is mounted at the lower end of each leg by a free swivel connection 29.

Considering one leg and arm assembly further, and it will be understood that both ends of the carriage are the same with the four legs similarly attached and operative, the leg 24 extends downwardly and laterally of the arm in a vertical plane at a fixed angle to the arm. This relationship is such to place the wheel of the leg approximately beneath the adjoining frame side when the arm is in its normal retracted position shown in Fig. 2. A tubular handle 30 is attached to and depends from the arm near the outer or unconnected end of the same and provides means for manually swinging the arm and leg. I have provided a second operating condition, shown by the dashed lines in Fig. 2, in which the arm has been swung outwardly approximately 90 degrees so as to be substantially parallel to the longitudinal axis of the frame. It will be observed that in this condition, the upper portion of the leg has been shifted outwardly of the frame end and that the direction of the leg is now such to place its wheel a considerable distance beyond the frame end, while still generally aligned with the frame side.

In order releasably to maintain the arm in its normal or extended condition, latch mechanism interengaged between the same and the frame is employed. Such mechanism comprises, as shown most clearly in Fig. 3, a first rod 31 slidably passed through openings provided therefor in the handle 30, a connecting tube 32 telescoped at one end with this first rod and with a second rod 33 at the other end, and a wedge 34 fitted over the free end of the second rod. The rod 33 extends through holes in the upper leg portion 25, and the several elements are axially joined to extend from the handle to a point adjacent the periphery of the frame bottom plate 20.

The bottom plate is formed with an inner notch 35 and an outer notch 36 into which the wedge extends respectively in the retracted and extended positions of the arm 21. The wedge 34 is spring-biased against the plate, for self-locking action, by means of a coil spring 37 arranged about rod 31 between the inner surface of the handle at the outer rod opening in the same and the adjacent end of the connecting tube 32. A trigger 38 is secured to the latter convenient to the handle for withdrawing the wedge when it is desired to swing the arm. The wedge carries an upwardly projecting guide pin 39 which rides in a slot 40 in the bottom wall of the arm, and a small guide plate 41 beneath such wall has the wedge body passed slidably therethrough. These guiding

elements ensure stability and proper operation of the latch actuating means. The forward end taper of the wedge, of course, corresponds to the contour of the notches in the plate 20.

It will accordingly be seen that the carriage legs and wheels may normally be tucked beneath the top frame for easy handling in motion, in maneuvering around corners, and the like. By virtue of the individual adjustment of the legs, the spacing of each from the others may be varied to meet particular situations, for example, in the previously noted association with a pedestal type X-ray table.

Usually all of the legs will either be tucked or extended, although other combinations are obviously possible. A further significant feature is the fact that the legs in the described embodiment are not merely spreadable at the lower ends or wheels, but also capable of being spaced further apart than normal at their upper end portions. Thus, the clearance between the leg pairs at the respective ends of the carriage may be increased as well to accommodate X-ray tables of varying length without having to elongate permanently the carriage frame to suit the maximum table length.

With regard to the latch mechanism specifically disclosed, it will be apparent that the trigger nature of the same affords very quick and convenient actuation of the several latches. Other locking means could, of course, be substituted, and regardless of the type employed, the construction could readily be adapted to hold the legs selectively in positions other than or in addition to those I have described.

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 any of the following claims or the equivalent of such be employed.

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

1. In a hospital carriage including a top frame, a link pivotally connected to an end of said frame for horizontal swinging movement, a leg secured to said link at a point spaced therealong from such pivotal connection, said leg extending downwardly and laterally of the link in a vertical plane having a fixed angular relationship to the link axis, anti-friction means attached by a swivel connection to the lower end of said leg, and locking means operative to hold the link selectively in various positions of adjustment about its pivotal connection to the frame, the link in one such position placing the anti-friction means beneath the frame and in another position outwardly of the frame end.

2. In a hospital carriage including a top frame, a link pivotally connected to an end of said frame for horizontal swinging movement, a leg secured to said link, anti-friction means attached to the lower end of the leg, an operating handle on said link for adjusting the same about its pivotal connection to the frame, spring-biased latch means interengaged between the link and frame for holding the link in various positions of adjustment, and trigger release means adjacent said handle for freeing the link from the action of said latch means.

3. In a hospital carriage including a top frame, a link pivotally connected to an end of said frame for horizontal swinging movement, a leg secured to said link at a point spaced therealong from such pivotal connection, said leg extending downwardly of the link in a vertical plane having a fixed relationship to the link axis, anti-friction means attached by a swivel connection to the lower end of said leg, and locking means operative to hold the link selectively in various positions of adjustment about its pivotal connection to the frame, the link in one such position placing the anti-friction means substantially beneath the frame and in another position outwardly of the frame end.

(References on following page)

References Cited in the file of this patent

UNITED STATES PATENTS

186,171	Schier	Jan. 9, 1877
290,088	Morrison	Dec. 11, 1883
776,313	Fosdick	Nov. 29, 1904
1,350,963	Fowler	Aug. 24, 1920
2,035,321	KoenigKramer et al.	Mar. 24, 1937
2,174,434	Beaufour	Sept. 26, 1939
2,425,370	Giberson	Aug. 12, 1947
2,544,228	Hoppe	Mar. 6, 1951
2,595,651	Feist	May 6, 1952
2,681,839	Limbach	June 22, 1954

FOREIGN PATENTS

287,233	Sweden	Mar. 16, 1953