

[54] AMBULANCE COT CONSTRUCTION

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[22] Filed: May 20, 1970

[21] Appl. No.: 39,044

[52] U.S. Cl. 5/62, 5/68, 5/86, 296/20

[51] Int. Cl. A61g 1/02, A61g 7/10

[58] Field of Search.....5/61, 62, 63, 81, 86; 296/19, 296/20

[56] References Cited

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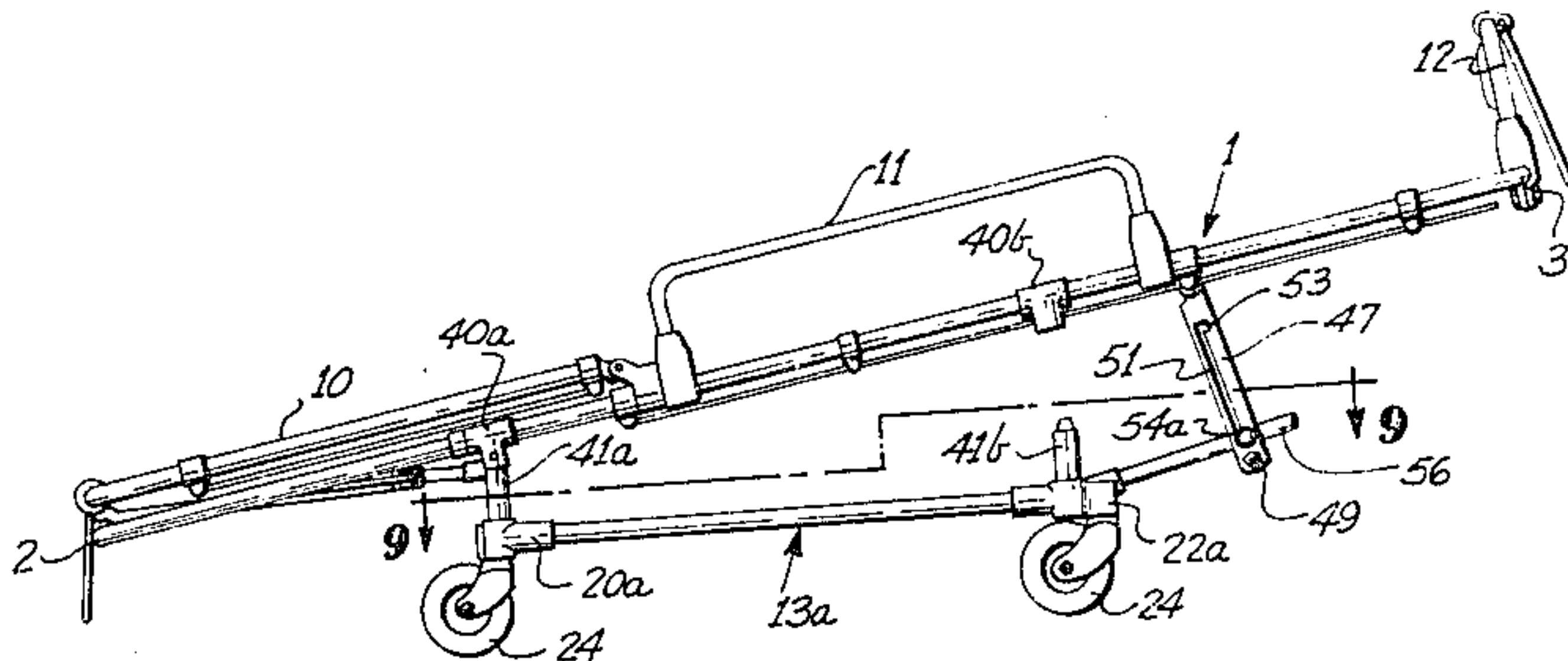
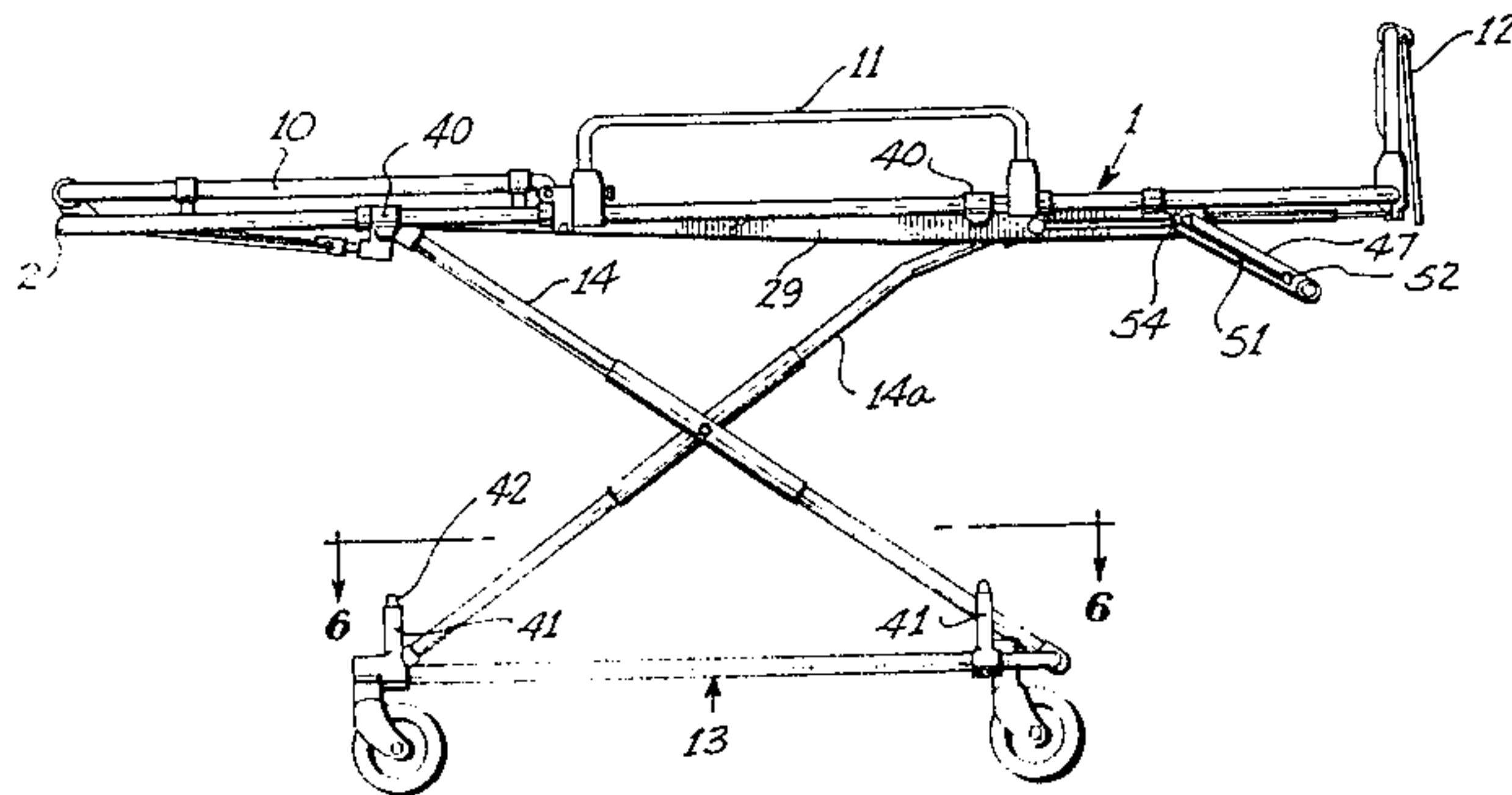
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[57] **ABSTRACT**

An adjustable ambulance cot construction wherein the patient-supporting frame of the cot is adjustable to effect the Trendelenburg position in which the patient's feet are elevated relative to the head, the cot frame being pivotally movable relative to one end of the undercarriage or other support on which the cot frame is mounted, the cot frame being releasably held in the elevated position by means of spring-biased slotted arms interconnecting the cot frame and a portion of the undercarriage, the arms being movable from an extended to a retracted position, thereby raising and lowering the foot end of the cot. The invention is applicable to elevating and nonelevating types of cots, and in the former case contemplates an improved undercarriage which enables the entire cot frame to be raised or lowered irrespective of whether the cot frame is in a horizontal position or in the Trendelenburg position.

9 Claims, 10 Drawing Figures



Patented Feb. 29, 1972

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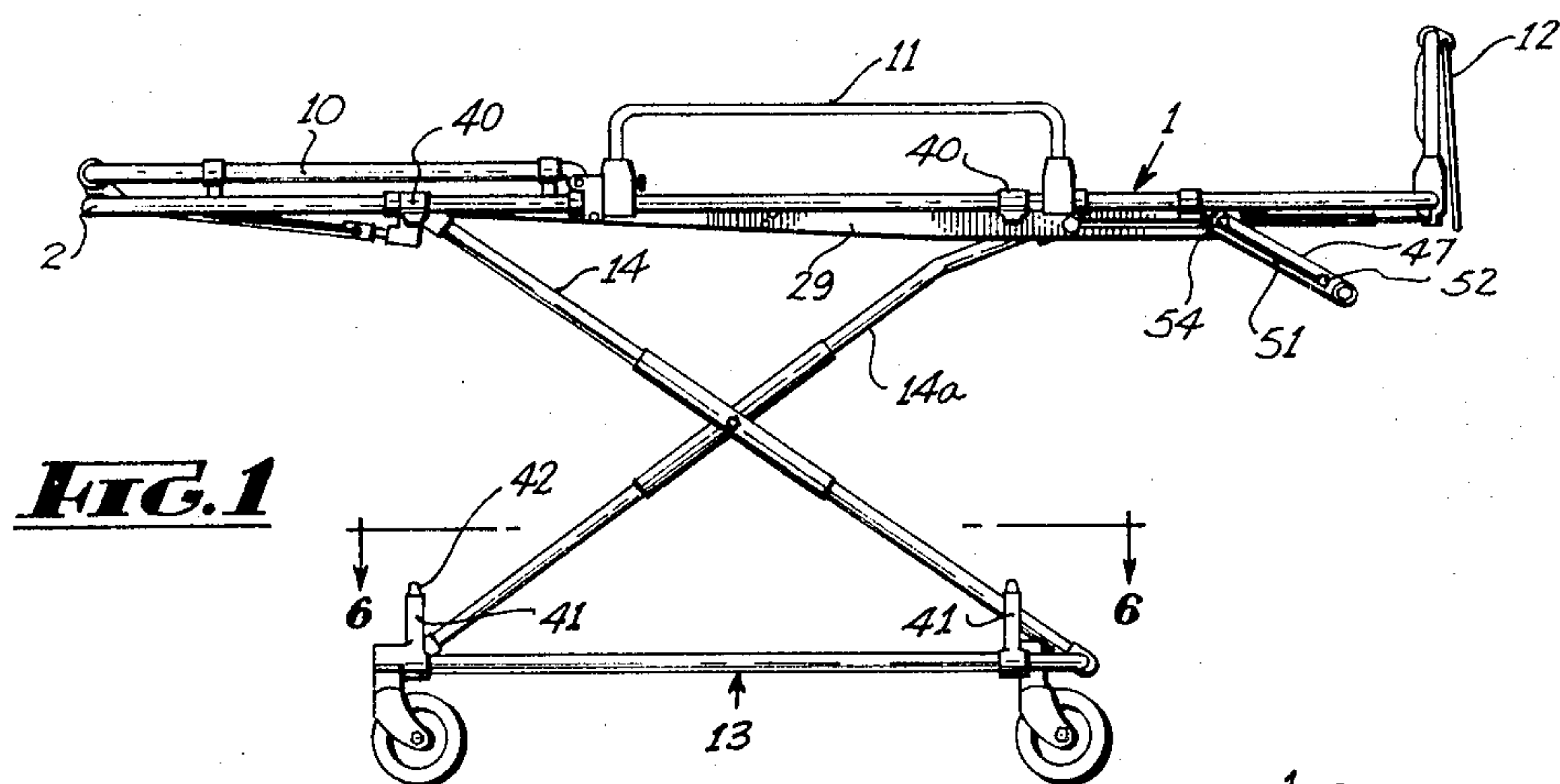


FIG. 1

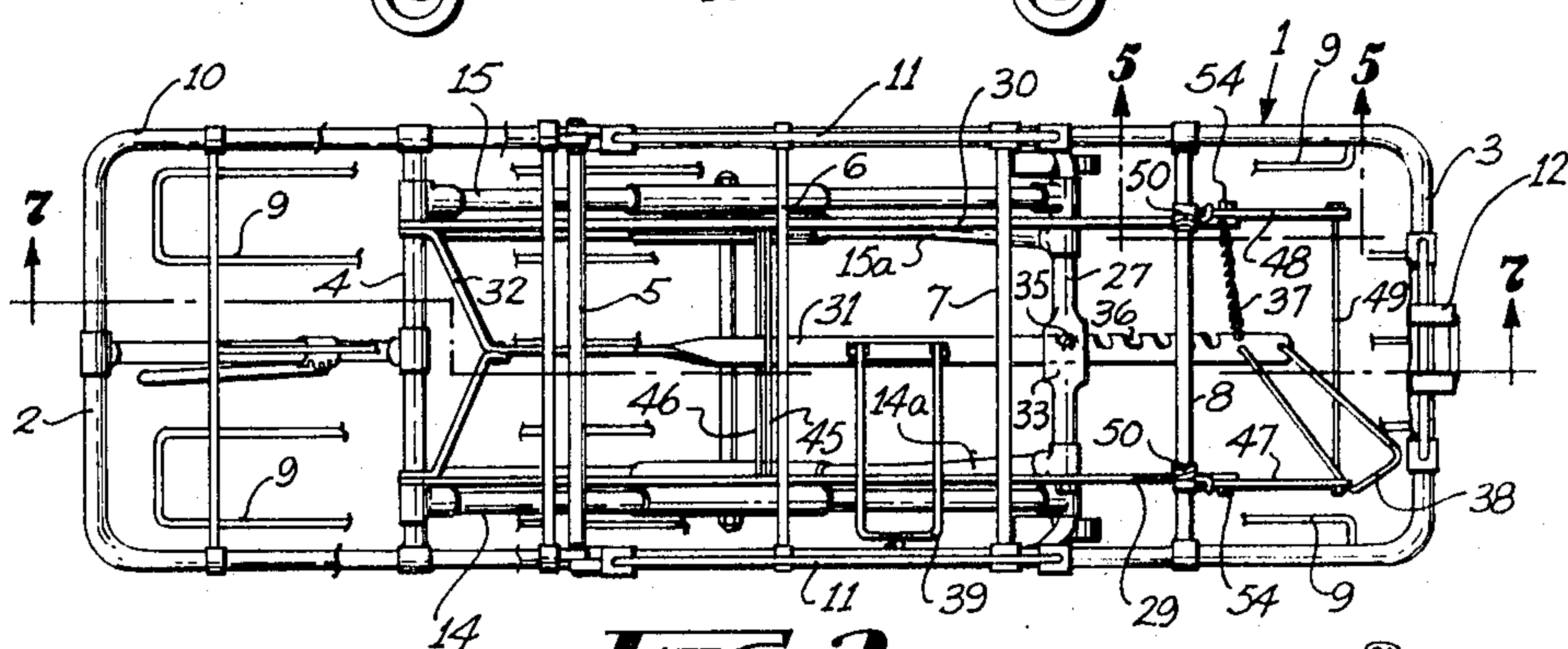


FIG. 2

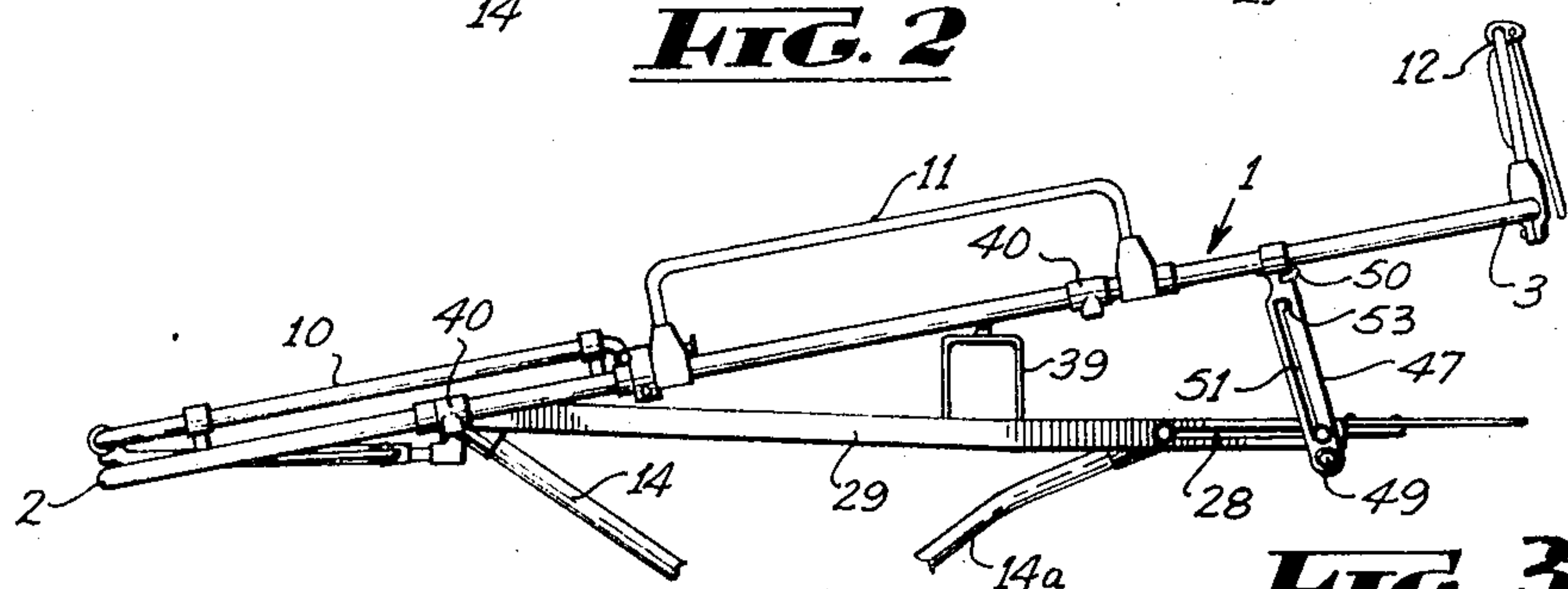


FIG. 3

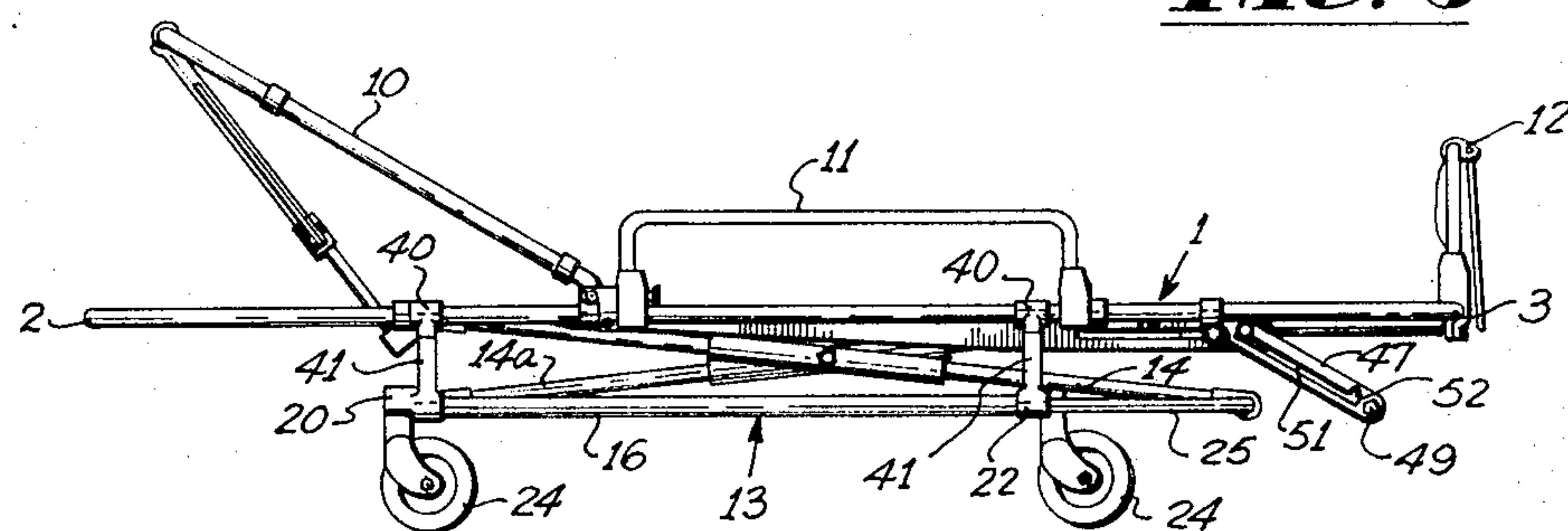


FIG. 4

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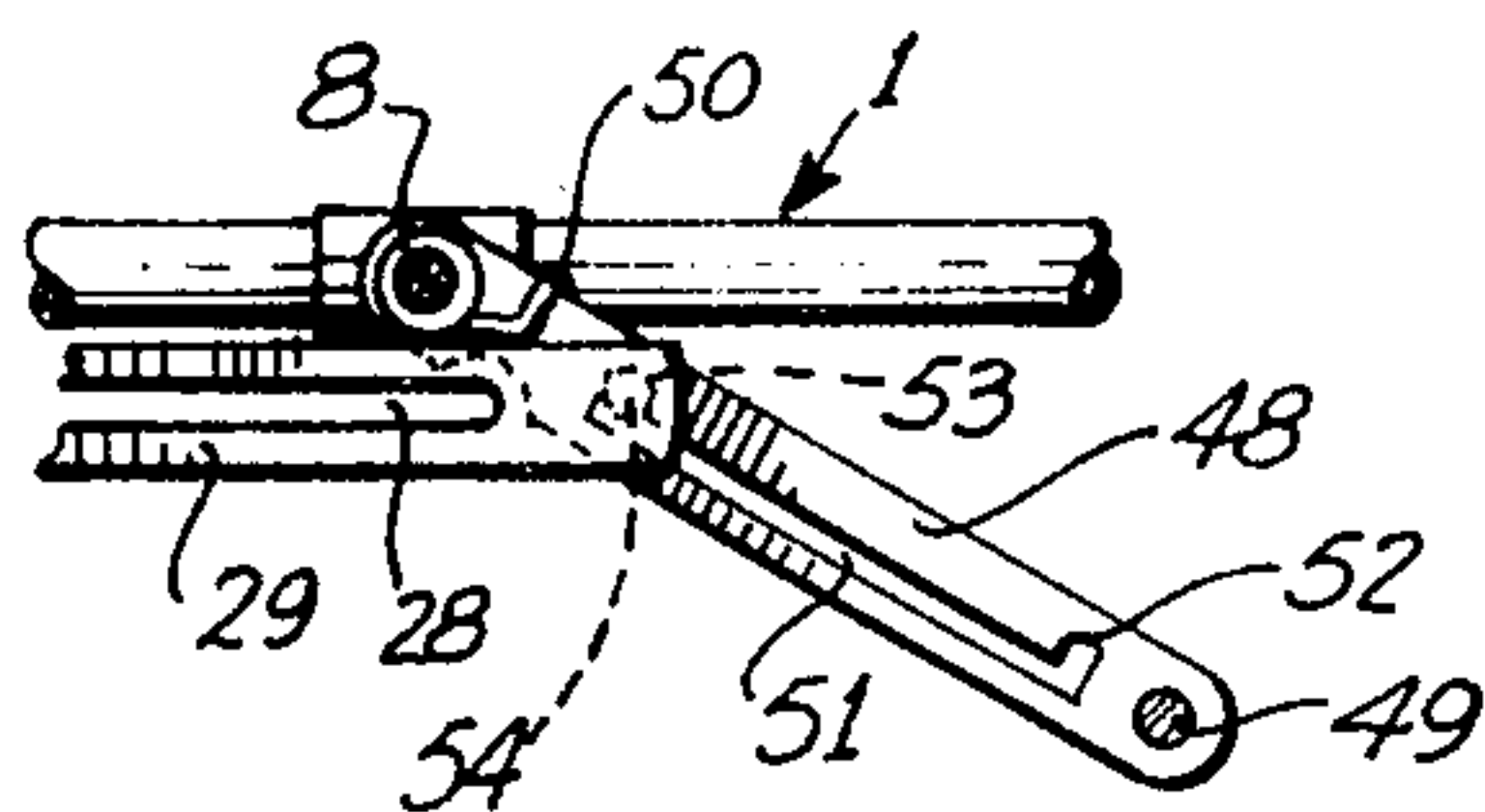


FIG. 5

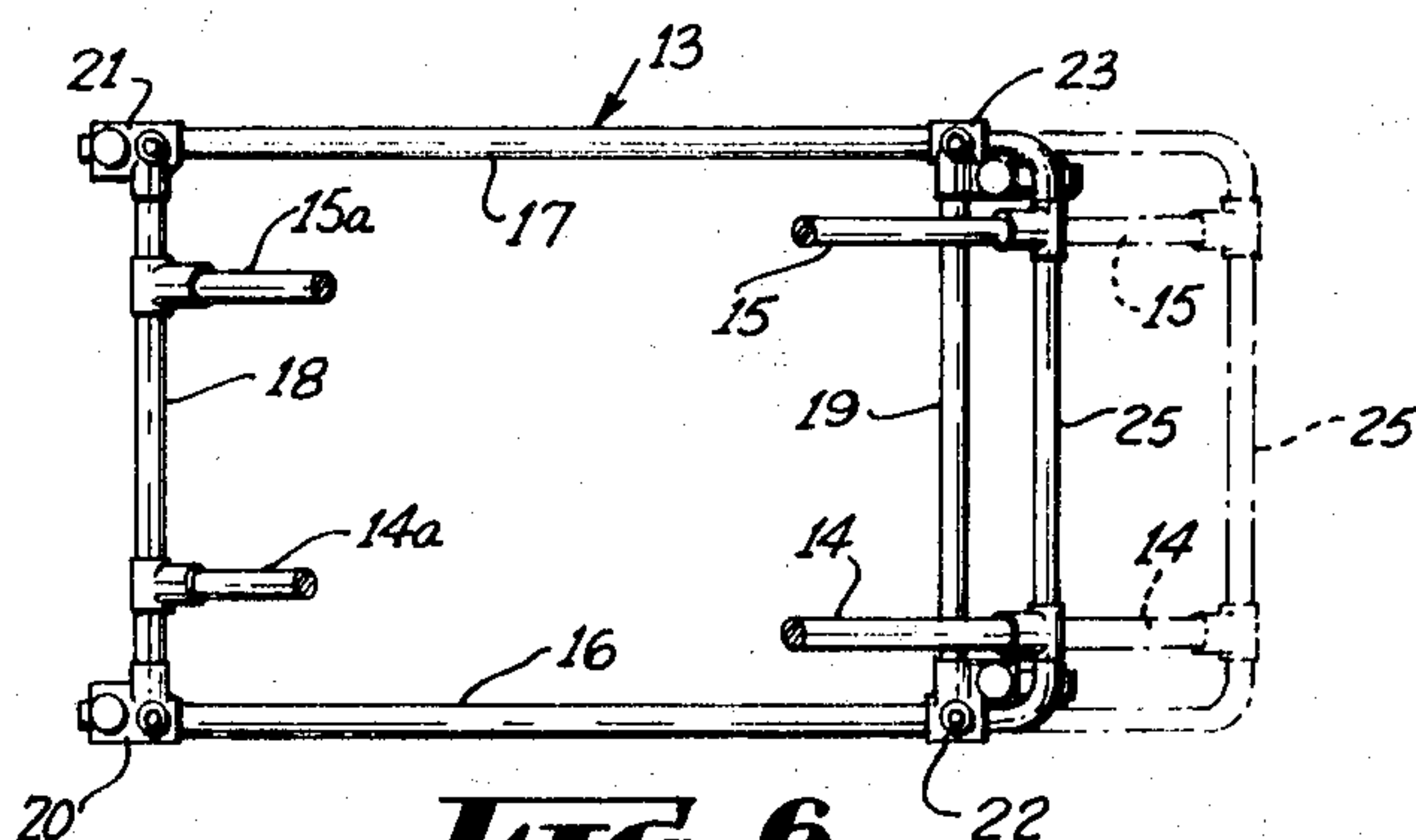


FIG. 6

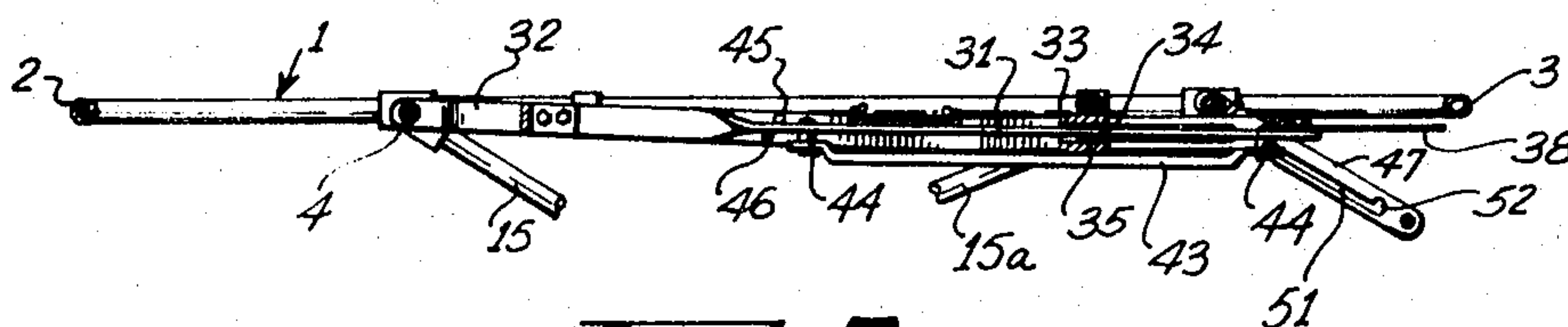


FIG. 7

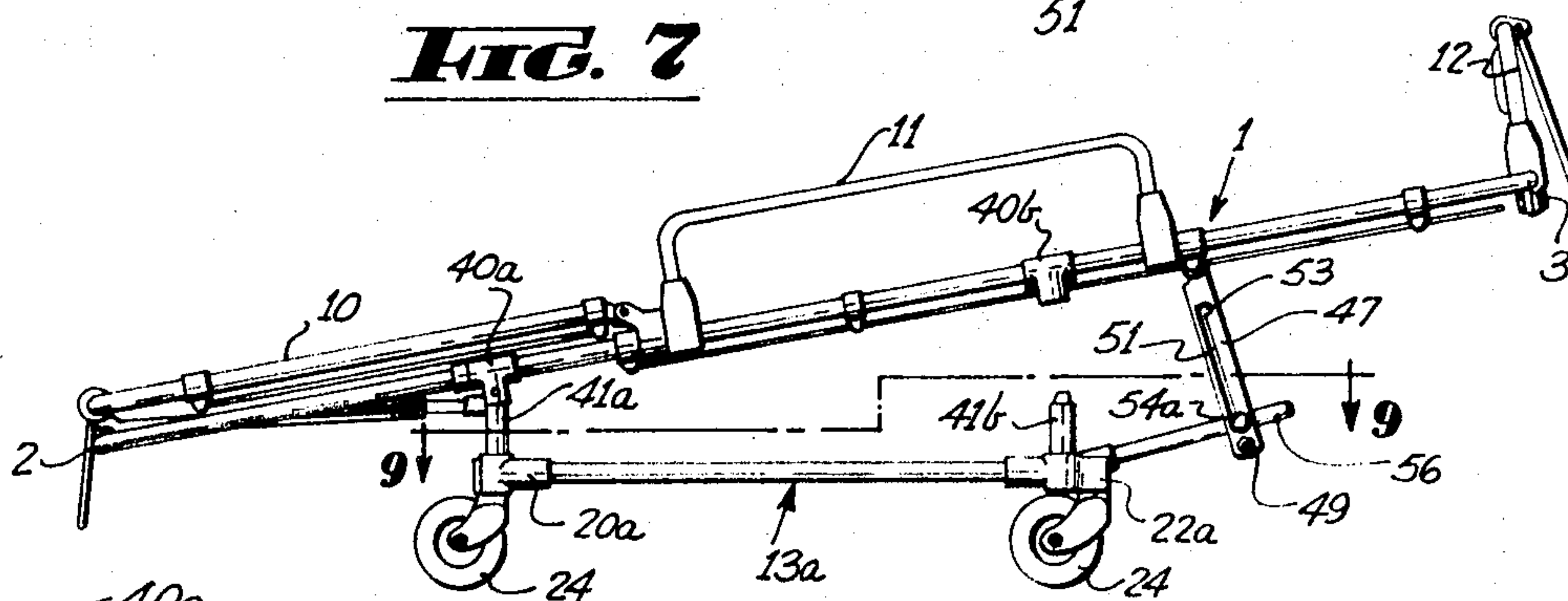


FIG. 8

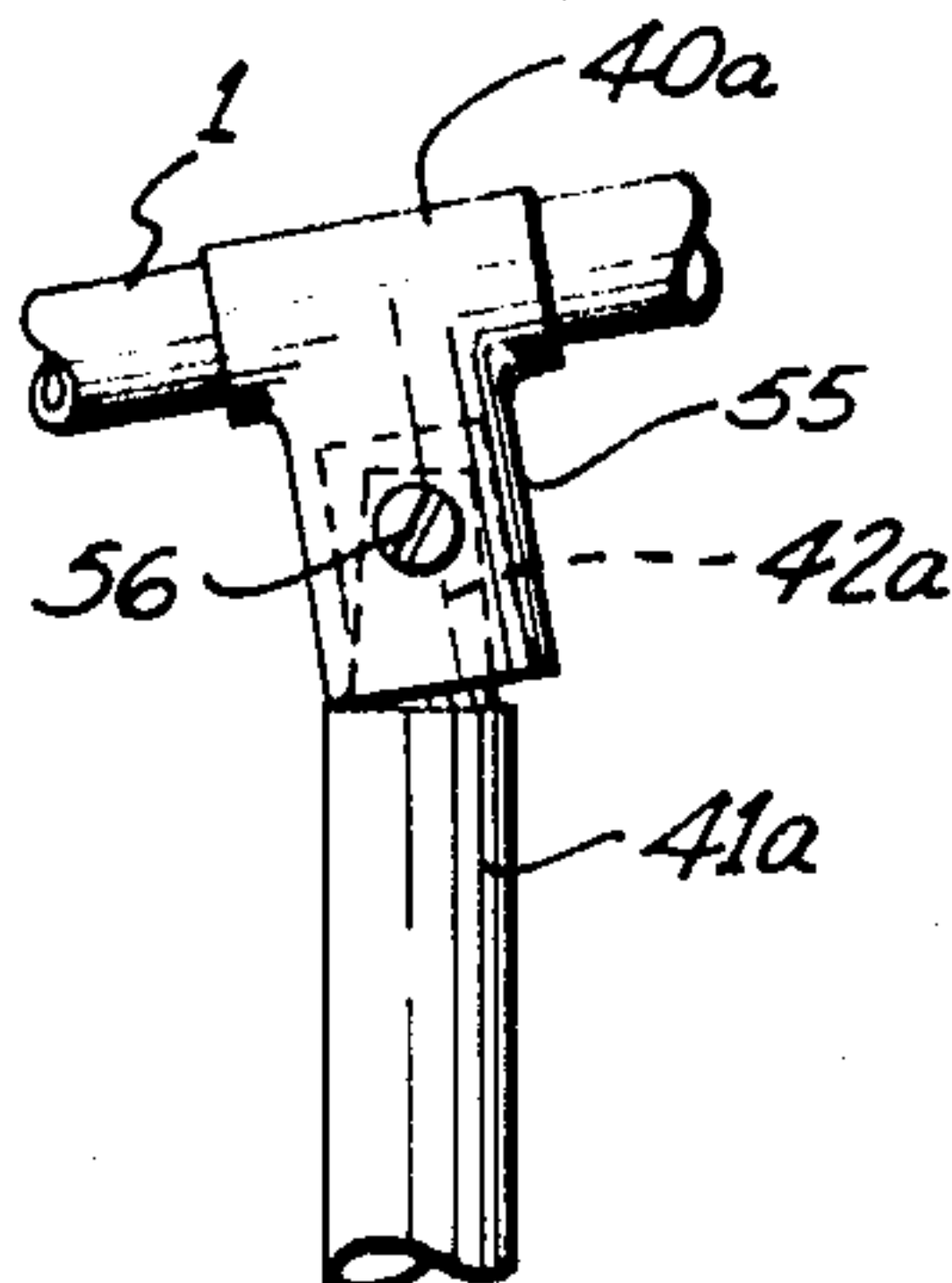


FIG. 10

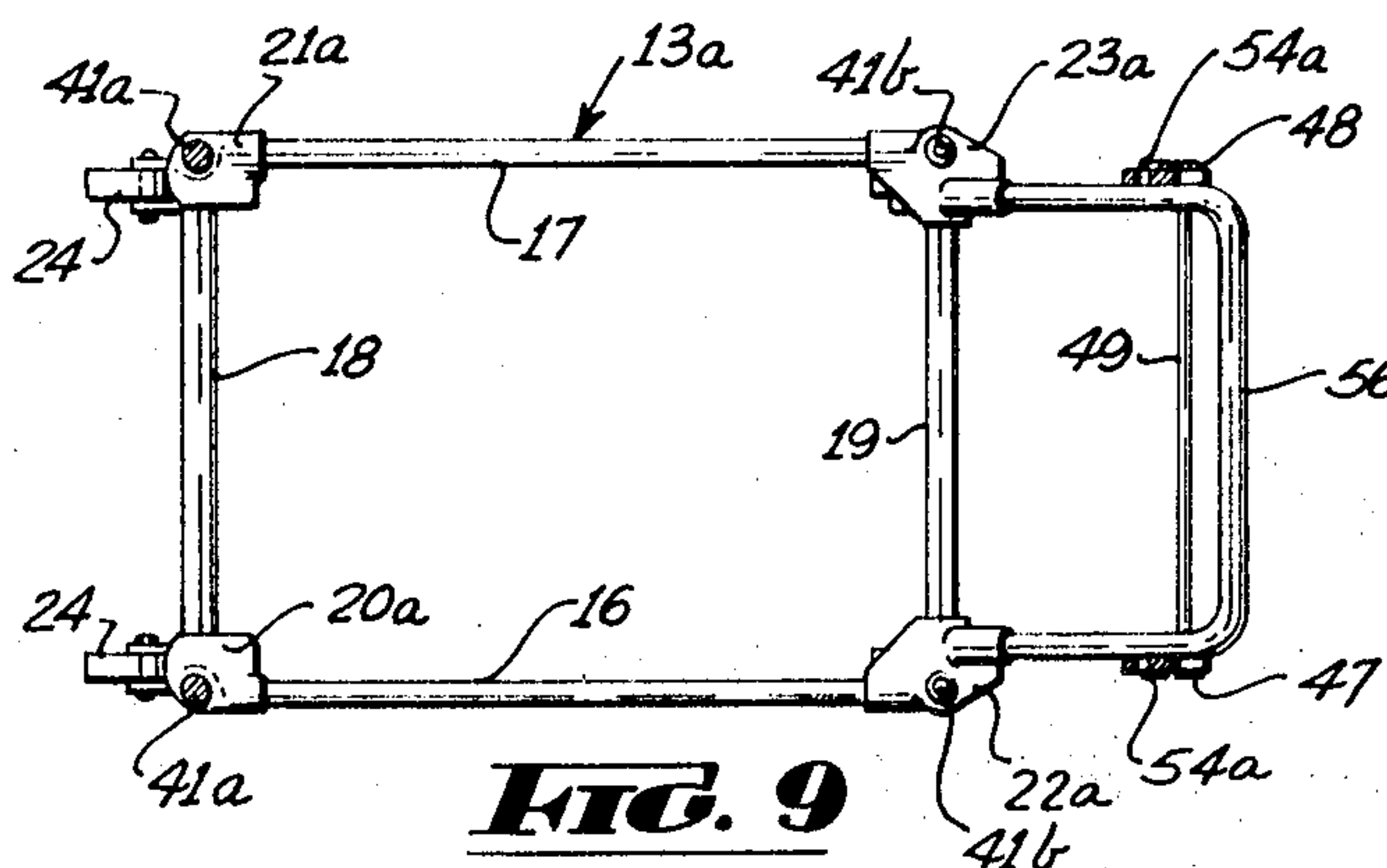


FIG. 9

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AMBULANCE COT CONSTRUCTION

BACKGROUND OF THE INVENTION

The present invention relates to portable cots of the type used in ambulance and similar vehicles for transporting patients, and has to do more particularly with adjustable cot frames capable of being elevated to assuming the Trendelenburg position in which the patient's feet are angled approximately 10° higher than his head. It has been found that this position reduces the load on the heart, encourages circulation, and enables the attendant to keep the patient's air passages cleared, thereby improving patient care during transportation to a hospital or other treatment facility.

Present day ambulance cots take several forms. The conventional cot comprises a cot frame of generally rectangular shape provided with suitable supports for a mattress, the cot frame being mounted on a wheeled undercarriage, with the frame in close proximity to the undercarriage so that the cot may be readily placed in an ambulance. Elevating cots have also been proposed wherein the cot frame is mounted to a wheeled undercarriage by means of collapsible legs so that the cot may be placed in the ambulance when the legs are in the "down" or collapsed position, whereas the cot frame may be raised to the "up" or elevated position in which it is at hospital bed or operating table height for readily transferring the patient to or from the cot. An elevating cot requires far less heavy lifting on the part of the attendants, resulting in less danger of strain and far less chance of jarring or injuring the patient. While its utility is not so limited, the present invention is particularly suited for use in conjunction with a multiple position elevating cot of the type taught in U.S. Pat. No. 2,958,873, dated Nov. 8, 1960, which teaches the provision of an elevating cot which may be selectively raised and lowered to a plurality of positions, the cot frame or bed being supported on and elevated by cross-forming or scissorlike frame members which are pivoted together and secured at their lower ends to an undercarriage having sets of wheels, the undercarriage including an adjustable extension by means of which the cross-forming frame members may be raised and lowered without altering the wheel base of the undercarriage. In one aspect, the present invention contemplates the modification of the elevating cot construction taught in the aforementioned patent to enable the cot frame to be pivoted relative to the cross-forming frame members without interfering with their ability to raise and lower the frame to its desired position of use; and in another aspect, the invention contemplates the provision of mechanism by means of which the cot frame may be readily adjusted to the Trendelenburg position or returned to level position for normal ambulance service with easy one-hand control, irrespective of whether the cot is of an elevating or nonelevating type.

RESUME OF THE INVENTION

In accordance with the invention, the cot frame, which is generally rectangular shape and provided with suitable mattress supporting ribs or straps, is pivotally connected to the undercarriage toward the head end of the cot frame. The cot frame is preferably formed from aluminum tubing, although it should be understood that the construction of the frame as such does not constitute a limitation on the invention and any standard frame may be employed, inclusive of frames having appurtenances such as a supplementary head-elevating frame, siderails, footrests, and the like.

In the nonelevating type of cot, the cot frame is pivotally connected to a pair of relatively short legs or posts projecting upwardly from the corners at one end of a generally rectangular undercarriage underlying the central portion of the cot frame. A similar pair of posts project upwardly from the corners at the opposite end of the undercarriage, the siderails of the cot frame mounting sockets adapted to receive the upper ends of the last-named posts when the cot frame is in the level position. The undercarriage is provided with a rigid U-shape extension projecting outwardly beyond the last-named end of

the undercarriage, the extension having pins projecting outwardly from its opposite side edges engageable in elongated slots in an interconnected pair of arms pivotally mounted at their opposite ends to a rod extending between the opposite sides of the cot frame. The elongated slots have notches at their opposite ends in which the pins are selectively engageable, the arms being spring biased to urge the notches into engagement with the pins. The arrangement is such that when the cot frame is in its level position, with the sockets on the siderails of the cot frame seated on the underlying posts, the pins on the U-shaped extension will be in engagement with the notches at the uppermost ends of the arms and the cot frame will be locked in level position relative to the undercarriage. The cot frame may be pivoted to the angled or Trendelenburg position simply by jointly moving the arms against the bias of their springs to disengage the pins from the notches, whereupon the cot frame and arms are elevated and locked in the elevated position upon engagement of the notches at the lower ends of the slots with the pins, the parts being locked in the elevated position by the spring-biased arms.

In the elevating type of cot, the cot frame is pivotally connected toward its head end to the uppermost ends of a corresponding pair of the cross-forming frame members, the remaining pair of cross-forming frame members having their upper ends slidably connected to a supplementary frame member underlying the cot frame and extending between the upper ends of the opposing sets of cross-forming frame members. When the cot frame is in its level position, its foot end is effectively supported by the supplementary frame and, when the cot frame is pivoted upwardly to the Trendelenburg position, it moves upwardly relative to the supplementary frame which mounts slot receiving pins on its opposite side edges for receiving the elongated slots and notches of the pivoted arms by means of which the cot frame is secured in either its level position or in the Trendelenburg position, the arms being mounted to the cot frame in the manner previously described in conjunction with the nonelevating cot construction.

In the elevating cot, the elevating movement of the cross-forming frame members is controlled by a locking device lying immediately beneath the cot frame. This device includes an elongated locking bar associated with the supplementary frame and arranged to permit the upper ends of a coacting pair of the cross-forming frame members to slide lengthwise relative to the supplementary frame. Means are provided to facilitate attendant control of the locking device from either the side or end of the cot, irrespective of whether the cot frame is in raised or lowered position, or whether the cot frame is level or in the Trendelenburg position. In addition, means are provided to strengthen and rigidify the elongated locking bar and prevent it from buckling or otherwise becoming distorted in use.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevational view of a multiple position elevating cot embodying adjustment means in accordance with the invention.

FIG. 2 is a plan view thereof.

FIG. 3 is a fragmentary side elevational view similar to FIG. 1 but with the cot frame in the Trendelenburg position.

FIG. 4 is a side elevational view similar to FIG. 1 but illustrating the cot frame in its lowermost or "down" position, the view also illustrating the use of a cot frame having a supplementary head elevating frame section.

FIG. 5 is an enlarged fragmentary sectional view taken along the line 5—5 of FIG. 2.

FIG. 6 is a vertical sectional view taken along the line 6—6 of FIG. 1, with the extended portion of the under carriage indicated in dotted lines.

FIG. 7 is a vertical sectional view taken along the irregular line 7—7 of FIG. 2.

FIG. 8 is a side elevational view of the invention applied to a conventional nonelevating cot construction.

FIG. 9 is a sectional view taken along the line 9—9 of FIG. 8.

FIG. 10 is an enlarged fragmentary elevational view of the socketlike fitting pivotally connecting the cot frame to the posts of the under carriage.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring first to FIGS. 1 and 2, which relate to a multiple position elevating cot, the structure has a generally rectangular cot frame 1 having a head end 2 and a foot end 3, the frame being provided with cross braces, such as the braces 4, 5, 6, 7, and 8 which rigidify the frame and, along with ribs, such as the ribs 9, serve to support a mattress. In the embodiment illustrated, the cot frame is provided with a supplementary head elevating frame 10, side rails 11, and foot rail 12 which, as such, do not constitute parts of the present invention.

The cot frame is mounted on an undercarriage 13 which comprises a generally rectangular frame which mounts the cross-forming pairs of frame members 14, 14a, and 15, 15a. As best seen in FIG. 6, the undercarriage frame 13 has side frame members 16 and 17 connected together at one end by an end frame member 18 and at the other by an end frame member 19, the frame members being interconnected by means of fittings 20, 21, and 22, 23, each of which mounts a caster wheel 24. The side frame members 16 and 17 are tubular, as are portions of the fittings 22 and 23 which receive the ends of the side frame members, and a U-shaped extension 25 is telescopically received by the side frame members of the undercarriage. The lowermost ends of the cross-forming frame members 14 and 15 are pivotally connected to the telescoping extension 25, whereas the lowermost ends of the cross-forming frame members 14a and 15a are pivotally connected to the end frame member 18. The cross-forming frame members 14 and 15 thus move with the telescoping extension 25 upon movement from the position illustrated in solid lines to the position illustrated in dotted lines.

At their uppermost ends, the cross-forming frame members 14 and 15 are pivotally connected to the cross brace 4, whereas the uppermost ends of the cross-forming frame members 14a and 15a are pivotally connected to a transverse support 27 (FIG. 2) the opposite ends of which are slidably received in elongated slots, such as the slot 28, formed in the supplementary frame members 29 and 30. The supplementary frame members are pivotally connected at one end to the cross brace 4 immediately to the inside of the cross-forming frame members 14 and 15, the supplementary frame members extending lengthwise of the cot frame and underlying the cross braces 5, 6, 7, and 8, the supplementary frame members terminating slightly beyond the brace 8. The cot frame 1 may thus pivot relative to the supplementary frame, as defined by the frame members 29 and 30, about the cross brace 4. Thus, the cot frame 1 may be inclined relative to the undercarriage from the level position illustrated in FIG. 1 to the inclined or Trendelenburg position illustrated in FIG. 3 irrespective of whether the cot is in an elevated position, such as shown in FIG. 1, or in the collapsed or down position illustrated in FIG. 4.

The mechanism for raising or lowering the cot frame comprises the elongated locking bar 31 connected at one end to a yoke 32 which is also pivotally mounted on the cross brace 4. The elongated locking bar is twisted through substantially 90° intermediate its ends so as to provide a vertically disposed portion in engagement with the yoke 32 and a horizontally disposed portion extending through a fitting 33 forming a part of the transverse support 27 which extends between and is slidable in the elongated slots 28 in the supplementary frame members 29 and 30. As seen in FIG. 7, the fitting 33 has a passageway 34 extending therethrough in which the locking bar is slidably received, there being a pin 35 in the opening for selective engagement with the notches or teeth 36 (FIG. 2) formed in the locking bar. A spring 37 is arranged to urge the notches in the locking bar into engagement with the pin.

Preferably, the notches 36 will be undercut in such fashion that a slight raising of the supplementary frame is required before the locking bar can be moved laterally to release it from the pin. Lateral displacement of the locking bar is effected by means of the looplike release members 38 and 39 positioned to be readily grasped by the cot attendant either at the foot of the cot or along one side thereof.

It should be apparent that when the locking bar 31 is released, the transverse support 27 will be free to move outwardly, carrying the cross-forming frame members 14a and 15a with it; and concurrently, the lowermost ends of the cross-forming frame members 14 and 15 will move outwardly with the extensible portion 25 of the undercarriage, thereby permitting the cot frame to move downwardly toward the rectangular frame of the undercarriage, the extent of downward movement being determined by the reengagement of one of the teeth 36 with the pin 35. When the cot is in its fully lowered position, as shown in FIG. 4, the sockets 40 mounted on the opposite sides of the cot frame are adapted to seat on the upper ends of the corner posts 41 which project upwardly from the rectangular frame 13 of the undercarriage. The upper ends of the posts 41 are preferably of tapered configuration, as indicated at 42 in FIG. 1, thereby facilitating pivoting movement of the cot frame relative to the supplementary frame of the undercarriage when the cot frame is inclined to the Trendelenburg position.

Referring again to FIG. 7, provision has been made to reinforce the elongated locking bar 31 to prevent it from bending or buckling. To this end, it is preferred to reinforce the bar with a rigidifying rod 43 adapted to underlie the fitting 33, the rod being connected to the locking bar by means of spacers 44. In addition, it has been found desirable to provide a pair of transverse supporting rods 45 and 46 in advance of the twisted section of the actuating bar, the rods extending between the supplementary frame members 29 and 30 with the rods spaced apart vertically so that the locking bar may pass therebetween.

The mechanism by means of which the cot frame may be made to assume the Trendelenburg position comprises a pair of elongated arms 47 and 48 pivotally connected at their upper ends to the cross brace 8. At their opposite ends the arms are interconnected by a rod 49 which also serves as a convenient means for releasing the arms for movement from one position to another. The arms are biased for movement in a clockwise direction by means of springs 50. As best seen in FIG. 5, each of the arms has an elongated slot 51 therein terminating at its opposite end in notches 52 and 53 selectively engageable by pins 54 projecting outwardly from the ends of supplementary frame members 29 and 30, the pins being slidable in the slots 51. Thus, when the cot frame is in a level position, as illustrated in FIGS. 1, 3, 5, and 7, the pins 54 are held in locking engagement with the notches 52 by means of the springs 50 which bias the arms 47 and 48 in a clockwise direction. The cot frame 1 is thus securely fastened to the supplementary frame members 29 and 30 and will remain in the level position.

When it is desired to incline the cot frame 1 to the Trendelenburg position, the attendant has only to grasp the rod 49 and pivot the arms 47 and 48 in a counterclockwise direction, thereby disengaging the notches 53 from the pins 54, whereupon the cot frame may be tilted upwardly, pivoting at the cross brace 4, with the pins 54 sliding downwardly in the slots 41. The lengths of the slots 51 will be such that when the notches 52 are reached by the pins, the cot frame will have been inclined at an angle of about 10°, which represents the preferred Trendelenburg position. Upon release of the rod 49, the spring bias of the arms 47 and 48 will cause the notches 52 to enter into locking engagement with the pins 54, thereby locking the cot frame in the inclined or Trendelenburg position. When in such position, the cot frame still may be raised or lowered, as desired, since the movement of the cross-forming frame members 14, 14a, and 15, 15a is independent of the cot frame as such.

It will be understood that when the cot is in its lowermost position, as illustrated in FIG. 4, with the sockets 40 seated on the posts 41, the tapered or rounded configuration of the posts relative to their sockets will permit inclining movement of the cot frame even though the sockets toward the head end of the cot remain seated on their posts. It will also be evident that the entire cot may be readily lifted by the cot frame irrespective of whether it is in the level or Trendelenburg position since the frame is, in either position, effectively locked to the supplementary frame forming a part of the undercarriage.

While the invention has thus far been described as applied to a multiple position elevating cot, it is equally applicable to a nonelevating cot of the type illustrated in FIGS. 8-10 wherein like parts have been given like reference numerals where possible. Thus, the cot frame 1 may be identical to the cot frame illustrated in FIGS. 1 through 7, although as previously indicated it may take various forms and any standard frame may be employed with or without appurtenances. In this instance, the undercarriage 13a is composed of side frame members 16 and 17, and end frame members 18 and 19, the end frame member 18 being connected to the side frame members by means of fittings 20a and 21a which mount caster wheels 24 and also upstanding posts 41a. In this instance, however, the cot frame is permanently secured to the posts 41a by means of sockets 40a in the manner illustrated in FIG. 10 wherein it will be seen that the tapered upper end 42a of the post is pivotally connected to the downwardly projecting tubular portion 55 of the socket by means of pivot pin 56. It will also be noted that the inside diameter of the tubular portion 55 is such that the cot frame 1 may pivot relative to the post.

The end frame member 19 is connected to the side frame members by means of fittings 22a and 23a which mount posts 41b which may be identical to the post 41a although they are not connected to the overlying sockets 40b; rather the sockets 40b are adapted to seat on the posts 41b when the cot frame is in the level position, the sockets being displaced relative to the posts when the Trendelenburg position is assumed.

In this embodiment, the fittings 22a and 23a mount a fixedly secured U-shaped extension 57 which is preferably inclined upwardly in the manner illustrated, the extension mounting outwardly projecting pins 54a adapted to be engaged by the slots 51 in the elongated arms 47 and 48 projecting downwardly from the cot frame.

The arms 47 and 48 are mounted in the same manner as described in conjunction with the embodiment of FIGS. 1-7, the only difference being that they coact with the extension 57 of the undercarriage rather than with the supplementary frame members employed in the elevating cot. When the cot frame is in the level position, the notches 53 will be in locking engagement with the pins 54a; whereas when the cot frame is inclined to the Trendelenburg position, the notches 52 will be in engagement with the pins 54a. As before, adjustment movement of the arms is effected by means of the rod 49 which, in this embodiment, underlies the extension 57.

As should now be evident, the instant invention provides an adjustable cot arrangement whereby the cot frame may be readily secured in either a level position or in the Trendelenburg position irrespective of whether the cot is of an elevating or nonelevating type. The moving mechanism, comprising the slotted and notched arms, insures that the cot frame will be retained in either position of use, and yet an attendant may rapidly and easily change the cot frame from one position to the other. Where the cot is of the elevating type, the tilting movement of the cot frame is independent of the mechanism by means of which the cot frame is raised and lowered, and the cot frame may be raised or lowered to the desired vertical position irrespective of whether the frame itself is level or inclined.

Modifications may be made in the invention without departing from its spirit and purpose. Various modifications have already been disclosed, and others will undoubtedly occur to the skilled worker in the art upon reading this specification. For example, the principles of the invention may be readily ap-

plied to cots of the type having collapsible legs which pivot out of the way when the cot is placed in ambulance. It will also be evident that the principles of the invention are equally applicable to a cot construction wherein it is desired to elevate the head end of the cot frame rather than the foot end thereof, depending upon the use to which the cot is to be put, and in the claims which follow the terms "head" and "foot" may be used interchangeably. While a preference is expressed for a pair of elongated actuating arms to control pivoting movement of the cot frame, it will be evident that a single such arm could be employed, although a plurality of arms is preferred due to the enhanced stability which results from such arrangement.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. In a cot construction, an elongated cot frame having a head end and a foot end; an undercarriage supporting said cot frame, said undercarriage comprising a rectangular frame mounting caster wheels; supporting posts projecting upwardly from the opposite ends of said rectangular frame, said cot frame, toward the head end thereof, being pivotally connected to the supporting posts at one end of the said rectangular frame for pivotal movement relative to said rectangular frame from a horizontal position to an inclined position in which the foot end of said cot frame is inclined upwardly relative to the head end; sockets mounted on said cot frame engageable with the supporting posts at the opposite end of said rectangular frame when said cot frame is in the horizontal position; a U-shaped extension projecting outwardly beyond the said opposite end of said rectangular frame; latching means for moving said cot frame from one position to the other, said latching means comprising a spaced-apart pair of elongated arms pivotally connected at their uppermost ends to said cot frame, said arms being interconnected for joint movement, an elongated slot in each of said arms extending lengthwise thereof, and transversely disposed notches at the opposite ends of said slots; pins mounted on said U-shaped extension, said pins extending through the slots in said elongated arms and being selectively engageable by the notches at the opposite ends of said elongated slots; and spring means biasing said arms so as to urge said notches into locking engagement with said pins, whereby when said pins are engaged by the notches at the uppermost ends of said slots, said cot frame will be locked in the horizontal position, and when said pins are engaged by the notches at the lower ends of said slots, said cot frame will be locked in the inclined position.

2. The cot construction claimed in claim 1 wherein said U-shaped extension is inclined upwardly relative to said rectangular frame.

3. The cot construction claimed in claim 2 wherein said cot frame mounts sockets positioned to engage the supporting posts at the first-named end of said rectangular frame, said cot frame being pivotally connected to said last-named posts by means of pivot pins interconnecting said last-named sockets and posts.

4. In a cot construction, an elongated cot frame having a head end and a foot end; a supplementary frame underlying and pivotally connected to said cot frame toward the head end of said cot frame, said cot frame being pivotally movable relative to said supplementary frame from a horizontal position to an inclined position in which the foot end of said cot frame is inclined upwardly relative to its head end; an undercarriage supporting said cot frame, said undercarriage comprising a rectangular frame mounting caster wheels, coacting pairs of cross-forming frame members interconnecting said rectangular frame and said supplementary frame; and latching means for moving said cot frame from one position to the other, said latching means comprising a spaced-apart pair of elongated arms pivotally connected at their upper ends to said cot frame toward the foot end thereof, said arms being interconnected for joint movement, an elongated slot in each of said arms extending lengthwise thereof, said slots having transversely disposed notches at their opposite ends; pins mounted on said

supplementary frame, said pins extending through the slots in said elongated arms and being selectively engageable by the notches at the opposite ends of said slots; and spring means biasing said arms so as to urge said notches into locking engagement with said pins, whereby when said pins are engaged with the notches at the upper ends of said slots, said cot frame will be locked in the horizontal position, and when said pins are engaged by the notches at the lower ends of said slots, said cot frame will be locked in the inclined position.

5. The cot construction claimed in claim 4 wherein the rectangular frame of said undercarriage includes an adjustable extension, wherein the lower end of one of the cross-forming frame members in each pair is pivotally connected to said extension, with the upper ends of said last named cross-forming frame members pivotally connected to said cot frame and said supplementary frame along a common axis, and wherein the upper end of the other cross-forming frame member in each pair is adjustably connected to said supplementary frame, and locking means for securing said pairs of coacting cross-forming frame members in a plurality of fixed positions.

6. The cot construction claimed in claim 5 wherein said

locking means comprises an elongated locking bar operatively connected to said supplementary frame, said supplementary frame mounting a fitting in which said locking bar is received, said bar having a plurality of notches extending lengthwise thereof selectively engageable with an obstruction forming part of said fitting, spring means biasing the notches in said locking bar in the direction of said obstruction, and means for disengaging said locking bar when it is desired to adjust the position of said cross-forming frame members.

7. The cot construction claimed in claim 6 wherein said locking bar is reinforced by a strengthening rod bridging said fitting.

8. The cot structure claimed in claim 7 wherein said locking bar also extends between a vertically spaced-apart pair of supporting rods forming a part of said supplementary frame.

9. The cot structure claimed in claim 5 wherein cot frame supporting posts project upwardly from the rectangular frame of said undercarriage, and wherein said cot frame mounts sockets engageable with said posts when said cot frame assumes a lowermost position.

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