

# A New Type of Flat Vehicle for Emergency Patient Transfer

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## Abstract

The utility model discloses a new type of flat vehicle for emergency patient transfer, comprising a support frame, a bed board, an infusion stand and a transfer assembly; the transfer assembly comprises a trapezoidal base fixed on the upper part of the support frame, and a trapezoid mounted on the bottom or side of the bed board. A sliding sleeve, a limit pin, a fixing cylinder and a spring; the trapezoidal sliding sleeve is matched on the trapezoidal base, a pin shaft hole is arranged on the trapezoidal base, the fixing cylinder is fixed on the trapezoidal sliding sleeve, and the limit pin is sleeved in the fixing cylinder. The bottom of the limit pin protrudes from the trapezoidal sliding sleeve, and the upper part is provided with a traction rod; the spring is sleeved on the traction rod, and a limiting plate is arranged at intervals on both sides of the trapezoidal base, and the limiting plate is wrapped in the trapezoidal sliding sleeve. The outer end: by setting the transfer component, the bed board is allowed to be fixed, slid and completely disengaged from the support frame, which is convenient for transferring the bed board together with the patient on it during the patient transfer process. It provides convenience for medical staff.

## Keywords

Medical Equipment, Transportation, Emergency, Flat Vehicle

## 1. Introduction

**Technical Field:** The utility model belongs to the technical field of medical equipment; it is particularly related to a new type of flat vehicle for emergency patient transfer.

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**Background Technology:** The emergency transfer vehicle is a kind of equipment used in the first aid in the hospital, and it is a common equipment in the hospital [1]. In daily use, after receiving the first aid, the patient is usually transported to the emergency room by an ambulance. During the rescue process, it is often necessary to transport the patient at least one or more times. However, in the existing transfer method, since the bed board and the support frame are an integral structure, many people are often required to lift the patient's body, which is difficult and time-consuming to operate [2] [3]. For seriously ill patients, it is easy to cause the deterioration of the condition during the lifting process.

In view of the above problems, there is also a transfer flat car in which the bed board is separated from the support frame. The bed board is directly fixed on the support frame, and the bed board needs to be lifted upward to separate the connection structure, and then the bed board and the support frame can be separated [4]. During the whole transfer process, many people are required to lift the bed board, which is laborious to operate, especially the separation of the bed board and the support frame from the ambulance, the operation space is small, and most of the nurses are women, so the operation is difficult and brings inconvenience to people. Therefore, it is necessary to study a new type of flat vehicle for emergency patient transfer [5] [6].

## 2. Summary of the Invention

Aiming at the defects and problems existing in the existing equipment, the utility model provides a new type of flat vehicle for emergency patient transfer. It effectively solves the problem that the bed board and the support frame are difficult to separate in the existing equipment, and the bed board needs to be lifted, which is time-consuming and labor-intensive.

The scheme adopted by the utility model to solve its technical problem is: a new type of flat vehicle for emergency patient transfer, including a support frame, a bed board, an infusion pole and a transfer assembly. The bed plate is provided with a guard plate and an infusion stand, and the transfer assembly includes a trapezoidal base fixed on the upper part of the support frame, a trapezoidal sliding sleeve installed on the bottom or side of the bed plate, a limit pin, a fixed cylinder and a spring. The trapezoidal sliding sleeve is matched on the trapezoidal base and can slide along the trapezoidal base, and a pin shaft hole is arranged on the trapezoidal base. The fixing cylinder is fixed on the trapezoidal sliding sleeve, the limit pin is sleeved in the fixing cylinder, the bottom of the limiting pin passes through the trapezoidal sliding sleeve, and the upper part is provided with a traction rod, and the traction rod is led out from the upper part of the fixing cylinder, and is placed in the upper part of the fixing cylinder. The lead-out section is provided with a baffle. The spring is sleeved on the traction rod and is located between the fixing cylinder and the limit pin. When the limit pin is sleeved in the pin shaft hole, the trapezoidal sliding sleeve cannot slide along the trapezoidal base, and is arranged at intervals on both sides of the tra-

pezoidal base. The limit board is wrapped around the outer end of the trapezoidal sliding sleeve, and the bed board is fixed on the support frame.

Further, the drawbar includes a rectangular section of the upper section and a cylindrical section of the lower section; the upper part of the fixing cylinder is provided with a rectangular through hole, and the rectangular section is matched and sleeved in the through hole. When the rectangular section is pulled out of the through hole, the position of the drawbar can be maintained by turning the drawbar. The short side of the rectangular segment is equal to the diameter of the circular segment. The end of the drawbar is provided with a pull ring. The infusion frame is a retractable support frame, the bottom of the support frame is provided with a universal wheel, and the middle part of the support frame is provided with a placement plate.

The beneficial effects of the utility model: The utility model provides a flat car that is convenient for transferring a patient, which connects the bed board and the support frame through the transfer assembly, so that the bed board and the support frame can be fixed together and maintain a stable connection relationship. The concrete realization mode is, utilize the limit pin and the pin shaft hole to realize the fixation of the two lateral positions, utilize the limit plate that is arranged at the end of the trapezoidal base to limit the side of the trapezoidal sliding sleeve from the side, Fix the trapezoidal sliding sleeve on the trapezoidal base vertically, and the limit relationship disappears when the trapezoidal sliding sleeve is separated from the limit plate. At the same time, the bed board is allowed to slide relative to the support frame. The specific implementation method is as follows: Remove the limit pin from the pin hole, the lateral restraint disappears, push the guard board from the side, the bed board can slide along the trapezoidal base, and the bed board can be transported out of the ambulance by pushing. During the whole process, the position of the bed board is basically unchanged, and the bumps are small, and after a certain distance of lateral sliding, the trapezoidal sliding sleeve is released from the limitation of the limit plate, and the vertical restraint also disappears, thus allowing the bed board to be directly separated from the support frame. Due to the docking of the trapezoidal structure, it is convenient to dock when it is placed again.

At the same time, the present utility model sets the limit pin as the rectangular section of the upper section and the cylindrical section of the lower section, and its setting purpose is: Pull the limit pin upward to make the rectangular section come out of the trapezoidal sliding sleeve, rotate the limit pin to make the rectangular section touch the trapezoidal sliding sleeve, so that the limit pin is separated from the pin shaft hole and is in a fixed state, avoiding the sliding process of the bed board, the limit pin scratches the trapezoidal base.

Thus, the utility model has a novel structure, and by setting the transfer assembly, the bed board is allowed to be fixed, slid and completely disengaged from the support frame, so that the bed board and the patient on it are transported together during the patient transfer process. The sliding method is used

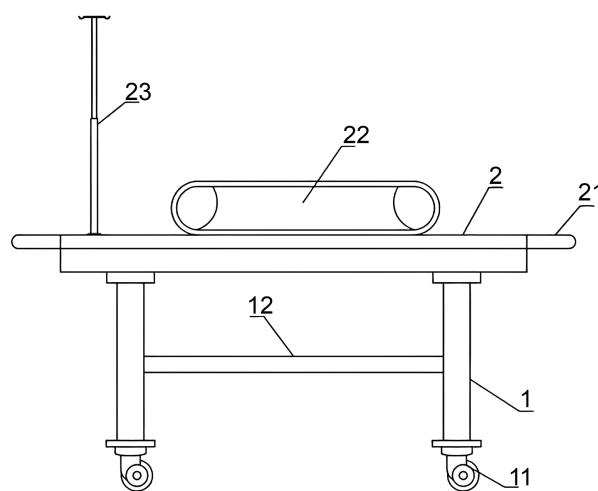
to move, which saves manpower, is easy to operate, and provides convenience for medical staff.

### 3. Discussion

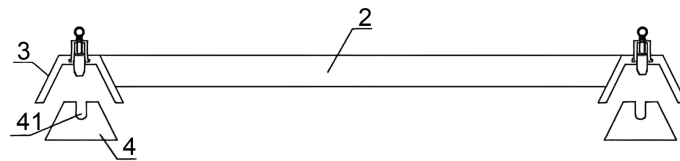
The present utility model will be further described below in conjunction with the accompanying drawings and embodiments.

Embodiment 1: The present embodiment aims to provide a new type of flat vehicle for emergency patient transfer, mainly used for the transfer of patients during emergency. In view of the existing structure, the bed board must be lifted for transferring the patient [7]. During the lifting process, it is easy to cause bumps, and the operation process is laborious and troublesome to use. This embodiment provides a patient transfer cart that is lightweight and easy to use [8] [9] [10].

This embodiment is shown in **Figure 1**: a new type of flat vehicle for emergency patient transfer includes a support frame 1, a bed board 2, an infusion frame 23 and a transfer assembly (**Figure 2**). Wherein, a guard plate 22 and an infusion stand 23 are provided on the bed board 2, a lifter 21 is provided at both ends of the bed board, the guard board 22 is used to protect the patient, and the infusion stand 23 is used for hanging infusion bottles. During the transfer process, the infusion stand 23 and the guard plate 22 are connected and the bed board is transported together, and the structure is reasonable. In addition, in the present embodiment, the infusion stand 23 can be telescopic and can specifically include a sleeve rod and a sleeve, and a lock wire is provided between the sleeve rod and the sleeve. The telescopic structure here can be adjusted as needed, and in the retracted state, it takes up little space. The bottom of the support frame 1 is provided with a universal wheel 11, and a placement plate 12 is provided in the middle of the support frame 1, and the placement plate 12 is used for placing articles.



**Figure 1.** Schematic diagram of the structure of the present utility model. 1. Support frame, 2. Bed board. 11. Universal wheel. 12. Place the board. 21. Lifter. 22. Guard plate. 23. Infusion stand.



**Figure 2.** Schematic diagram of the structure of the transport assembly. 3. Trapezoidal slide sleeve. 4. Trapezoidal base. 41. Pin shaft hole.

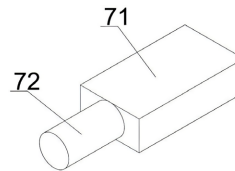
The transfer assembly includes a trapezoidal base 4 fixed on the upper part of the support frame 1, a trapezoidal sliding sleeve 3 mounted on the bottom or side of the bed board 2, a limit pin 6, a fixed cylinder 5 and a spring 8. The trapezoidal sliding sleeve 3 is matched and sleeved on the trapezoidal base 4, and can slide along the trapezoidal base 4, and a pin shaft hole 41 is arranged on the trapezoidal base 4. In this embodiment, only one pin shaft hole 41 is provided. In order to facilitate the butt joint between the limit pin and the pin shaft hole, the bottom of the limit pin 6 may be provided with a butt joint smaller than that of the pin shaft hole 41.

In this embodiment, the fixing cylinder 5 is a hollow structure, the fixing cylinder 5 is fixed on the trapezoidal sliding sleeve 3, and the limit pin 6 is sleeved in the fixing cylinder 5. The bottom of the limit pin 6 protrudes from the trapezoidal sliding sleeve 3, and the upper part of the limit pin 6 is provided with a traction rod 7 (**Figure 3**), and the traction rod 7 is drawn out from the upper part of the fixed cylinder 5, and a baffle plate is provided in the lead-out section. The baffle plate is used to overcome the elastic force of the spring, as the limit position of the limit pin 6 extending downward (**Figure 4**).

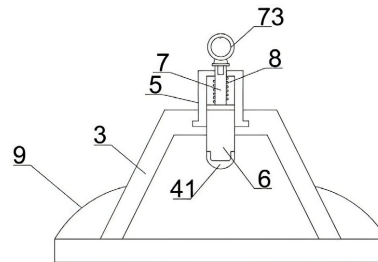
The spring 8 is sleeved on the traction rod 7 and is located between the fixing cylinder 5 and the limit pin 6. When the limiting pin 6 is sheathed in the pin shaft hole 41, the trapezoidal sliding sleeve 3 cannot slide along the trapezoidal base 4, and limiting plate 9 is arranged at intervals on both sides of the trapezoidal base 4. The limiting plate 9 is wrapped around the outer end of the trapezoidal sliding sleeve 3 to fix the bed plate 2 on the support frame 1. In this embodiment, in order to conveniently locate the position of the limiting pin 6 and the pin shaft hole 41, a positioning plate can also be provided on the trapezoidal sliding sleeve. When the positioning plate touches the limit plate, the limit pin just corresponds to the pin shaft hole.

In this embodiment, the bed board 2 and the support frame 1 are connected together through the transfer assembly, and are in three states.

First, the bed board 1 and the support frame 2 can be fixed together and maintain a stable connection relationship. The specific implementation method is to use the limit pin 6 and the pin shaft hole 41 to realize the fixation of the lateral positions of the two. The side of the trapezoidal sliding sleeve is limited from the side by the limiting plate 9 arranged at the end of the trapezoidal base, and the trapezoidal sliding sleeve is fixed on the trapezoidal base from the vertical direction, and the limiting relationship disappears when the trapezoidal sliding sleeve is separated from the limiting plate.



**Figure 3.** Schematic diagram of the structure of the traction rod. 71. Rectangular segment. 72. Cylindrical segment.



**Figure 4.** Schematic diagram of the structure of the limit plate. 5. Fixed cylinder. 6. Limit pin. 7. Traction rod. 8. Spring. 9. Limiting plate. 73. Pull ring.

Second, the bed board 2 slides relative to the support frame 1. The specific implementation method is to disengage the limit pin from the pin shaft hole, the lateral restraint disappears, push the guard plate 22 or lift the hand 21 from the side, and the bed plate (trapezoidal sliding sleeve) can slide along the trapezoidal base 4. The bed board was transported from the ambulance. During the whole process, the position of the bed board is basically unchanged, the bumps are small, and labor is saved. For further labor saving, rollers or rollers can be arranged between the trapezoidal sliding sleeve and the trapezoidal base.

Third, the bed board and the support frame are completely separated. After the trapezoidal sliding sleeve slides laterally relative to the trapezoidal base for a certain distance, the trapezoidal sliding sleeve escapes the restriction of the limit plate, and the vertical restraint also disappears, allowing the bed board to be directly separated from the support frame. Due to the butt joint of the trapezoidal structure (the trapezoidal sliding sleeve and the trapezoidal base), when the trapezoidal sliding sleeve is placed again, the docking is convenient.

Therefore, the novel structure of this embodiment is novel. By setting the transfer assembly, the bed board is allowed to be fixed, slid and completely disengaged from the support frame, so that the bed board and the patient on it can be transferred together during the patient transfer process [11]. It is moved by sliding, which saves manpower and is easy to operate, which provides convenience for medical staff [12] [13].

Embodiment 2: This embodiment is basically the same as Embodiment 1, and the difference lies in: the structure of the traction rod 7 is further described in this embodiment. In this embodiment, the end of the traction rod 7 is provided with a pull ring 73, and the traction rod 7 includes a rectangular section 71 of the upper section and a cylindrical section 72 of the lower section. The short side of the rectangular segment is equal to the diameter of the circular segment, the up-

per part of the fixing cylinder 5 is provided with a rectangular through hole, and the rectangular segment is matched and sleeved in the through hole. When the rectangular section 71 is pulled out of the through hole, the position of the traction rod can be maintained by rotating the traction rod, and the spring is sleeved on the cylindrical section and abuts against the bottom of the rectangular section. The diameter of the spring is larger than the short side of the through hole so that it does not come out of the through hole. During the specific operation, due to the elasticity of the spring, a downward pressure is applied to the limit pin, so that the limit pin protrudes from the trapezoidal sliding sleeve. Then manually overcome the elastic force, so that the spring continues to be compressed, and the rectangular section comes out of the through hole. Then turn the pull ring so that the long side of the rectangular segment corresponds to the short side of the through hole. In this way, the traction rod can be in a fixed state, and the limit pin can be retracted into the trapezoidal sliding sleeve, so as to prevent the limit pin from scratching the trapezoidal base during the sliding process of the bed board.

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### Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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