

# Design and Implementation of Firemen's Hose Back Frame

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## Abstract

The design relates to a fireman's water belt back frame, which comprises a frame body connecting multiple layers of water belts together, wherein the lower end of the frame body is provided with a cylinder body for placing a water belt connecting joint, the back side is provided with a partition board for isolating the multiple layers of water belts, and the front side is provided with a back strap for covering the back frame on a person's shoulder. A plurality of water belts can be carried through the frame body, A plurality of water belts are connected together through joints and orderly stacked in multiple layers in the frame body. Fire fighters first connect the joints of fire hoses to fire engines, that is, they carry the frame body up the stairs, and the water belts are automatically laid along the stairs. The water belts can be automatically unfolded to complete the laying, which not only frees firefighters' hands, but also reduces the workload of laying water bags. Sprinkler fire extinguishing is realized by laying high floors. Only one person can carry a plurality of water belts, which improves the efficiency and saves time and labor.

## Keywords

Fireman; Hose; Back Frame.

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## 1. Preface

With the development of society, various high-rise apartment buildings have become the main buildings where people live. When a fire breaks out in a high-rise building, it is necessary to lay a hose trunk line along the stairs in the shortest time to quickly put out water and put out fire. When a fire breaks out in a high-rise building, it is necessary to lay a fire hose on the floor. When laying a fire hose along the stairs, fire fighters need to use both hands and feet. It is time-consuming and laborious, and the laying efficiency is also very low. The fire hose is laid to the designated position purely by manpower pulling, which makes the fire fighters spend a lot of physical strength before starting the fire fighting operation, causing adverse effects in the fire fighting and rescue operation. It is also difficult for the hose to unfold smoothly when fighting fires in narrow roads or long distances such as hutongs. This is very unfavorable for fire fighting.

## 2. Design Content

The purpose of this design is to solve the above-mentioned problems in the prior art, provide a water belt back frame for firefighters, and solve the problems of inconvenient water belt laying, time consuming and labor consuming, etc.

To achieve the above purpose, the technical scheme adopted in this design is as follows.

The firefighter hose back frame comprises a frame body for connecting multiple layers of hoses together, wherein the lower end of the frame body is provided with a cylinder body for placing hose connection joints, the back side is provided with a partition board for isolating the multiple layers of hoses, and the front side is provided with a back strap for putting the back frame on a person's shoulder. The frame body comprises an upper arc plate and a lower arc plate. A vertical plate and a plurality of upright posts are connected between the upper arc plate and the lower arc plate, a guide rod is arranged

at the lower end of the lower arc plate, and a plurality of freely rotating cylinders are arranged on the guide rod. The vertical plate has a concave arc structure. The upright post is provided with a plurality of clapboards, and the clapboards are directly provided with cylinders sleeved on the upright post. Rollers are installed on the side of the lower arc plate. A buckle ring is arranged on the frame body, and two ends of the back strap are provided with clamp bodies corresponding to the buckle ring. Handles are arranged on both sides of the cylinder.

Brief description of drawings

### 3. Detailed Description

#### Example 1

As shown in fig. 1, the fireman's water belt back frame is characterized by comprising a frame body 1 for connecting multiple layers of water belts together, a cylinder body 2 for placing water belt connection joints is installed at the lower end of the frame body 1, a partition plate 3 for isolating the multiple layers of water belts is arranged on the back side, and a back strap 12 for putting the back frame on people's shoulders is arranged on the front side.

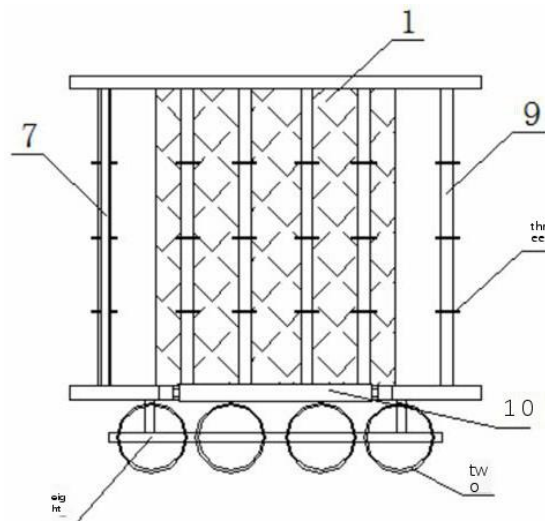


Fig. 1 The structural diagram of this design

The drawings are labeled as: 1. Frame, 2. Cylinder, 3. Partition, 4. Upper arc plate, 5. Lower arc plate, 6. Vertical plate, 7. Vertical column, 8. Guide rod, 9. Cylinder, 10. Roller, 11. Retaining ring, 12. Brace.

The frame body 1 comprises an upper arc plate 4 and a lower arc plate 5, a vertical plate 6 and a plurality of upright posts 7 are connected between the upper arc plate 4 and the lower arc plate 5, a guide rod 8 is arranged at the lower end of the lower arc plate 5, and a plurality of freely rotating cylinders 2 are arranged on the guide rod 8.

The vertical plate 6 has a concave arc structure.

The vertical column 7 is provided with a plurality of partition plates 3, and the partition plates 3 are directly provided with cylinders 9 sleeved on the vertical column 7.

A roller 10 is installed on the side of the lower arc plate 5.

The frame body 1 is provided with a snap ring 11, and two ends of the back strap 12 are provided with clip bodies corresponding to the snap ring 11.

Handles are arranged on both sides of the cylinder 2.

Taking four water belts as an example, the frame body 1 is divided into B, C, D and E layers, each layer is filled with a water belt, the joints between the water belts are connected together, the joints

are installed in the cylinder 2, the clamps at both ends of the back strap 12 are clamped into the buckle ring 11, the frame body 1 is sleeved on the shoulders of firefighters through the back strap 12, the water belt on the B layer is connected to the fire truck, and the firefighters carry the frame body 1 and climb up the stairs. The water belts are automatically laid down along the vertical columns 7 and the rollers 10. After the laying of the water belts in layer B is completed, the joints connecting the water belts in layer B and layer C are separated from the cylinder 2, and the cylinder 2 rotates downward to form a vertical arrangement. The water belts in layer C start to be laid automatically, and the water belts in layer D and layer E are laid down automatically in turn. After reaching the destination, the water belts start to spray fire. The frame body 1 can carry a plurality of water belts (at least more than four water belts can be installed), which are connected together through joints and orderly stacked in multiple layers in the frame body 1. Fire fighters first connect the joints of fire hoses to fire engines, that is, they carry the frame body 1 up the stairs, and the water belts are automatically laid along the stairs, and the water belts can be automatically unfolded to complete laying, which not only frees firefighters' hands, It also reduces the workload of laying water bags, realizes sprinkler fire extinguishing at the position where the floor is high, and only needs one person to carry a plurality of water belts, which improves the efficiency, saves time and labor, can set several fire fighters to carry out relay laying, has a large laying range, saves the physical strength of the fire fighters, and is also suitable for fires in narrow roads or long distances such as deep hutongs.

A joint connected with multiple disks of water belts is installed through the cylinder 2, which is convenient for the joint to automatically fall off the cylinder 2 when laying the water belts, so that the connected multiple disks of water belts will not be entangled during automatic laying.

Through the cylinder 9 and the roller 10, the friction of the hose on the frame 1 can be reduced, the laying speed can be accelerated, the wear of the hose can be reduced, and the service life of the hose can be guaranteed.

The handle is convenient for hand protection, stability and labor saving.

Through the vertical plate 6 with concave arc structure, it is convenient to place the air respirator and provide oxygen for firefighters.

The above-mentioned embodiments only express the specific embodiments of this application, and their descriptions are specific and detailed, but they cannot be understood as limiting the protection scope of this application. It should be pointed out that, for those of ordinary skill in the field, without departing from the technical scheme of this application, several modifications and improvements can be made. These all belong to the protection scope of this application.

#### **4. Concluding remarks**

The application has the beneficial effects that:

- a) The frame can carry a plurality of water belts (at least more than four water belts can be installed), which are connected together through joints and orderly stacked in multiple layers in the frame. Fire fighters first connect the joints of fire hoses to fire engines, that is, they carry the frame up the stairs, and the water belts are automatically laid along the stairs, which can be unfolded automatically to complete the laying, which not only frees firefighters' hands, It also reduces the workload of laying water bags, realizes sprinkler fire extinguishing at the position where the floor is high, and only needs one person to carry a plurality of water belts, which improves the efficiency, saves time and labor, can set several fire fighters to carry out relay laying, has a large laying range, saves the physical strength of the fire fighters, and is also suitable for fires in narrow roads or long distances such as deep hutongs.
- b) The joints connected with multiple disks of water belts are installed through the cylinder, which is convenient for the joints to automatically fall off the cylinder when laying the water belts, so that the connected multiple disks of water belts will not be entangled during automatic laying.

- c) Through the cylinder and the roller, the friction of the water belt on the frame can be reduced, the laying speed can be accelerated, the wear of the water belt can be reduced, and the service life of the water belt can be guaranteed.
- d) The handle is convenient for hand protection, stability and labor saving.
- e) Through the vertical plate with concave arc structure, it is convenient to place the air respirator and provide oxygen for firefighters.

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