An Intelligent Rescue Device

Technical Field

The present invention relates to the technical field of building rescue, and in particular to an intelligent rescue device.

Background Art

With the development of cities, available land in cities is decreasing. High-rise buildings can effectively save floor area, but at the same time the population density in high-rise buildings is relatively high, and the consequences of a fire are very serious. A fire is a type of major environmental safety accident and is extremely lethal to the safety of people's lives and property.

Patent document CN220149162U discloses an aerial fire rescue device for high-rise buildings. By arranging a telescopic plate on an internal bottom plate of a rescue operation cabin and connecting the telescopic plate to a hydraulic cylinder and a piston rod, the telescopic plate can be controlled, during rescue operations, by a PLC control panel to extend as a rescue standing platform to abut against a rescue site such as a window or a balcony. Thus, there is no gap between the rescue operation cabin and the rescue site during rescue, so as to prevent casualties caused by accidental situations resulting from an excessive gap. A support plate fixedly connected to the bottom of the rescue operation cabin supports the stability of the entire telescopic plate as the rescue standing platform, and guardrails on two sides of the telescopic plate can also ensure the personal safety of rescuers and trapped persons during rescue.

Although the above aerial fire rescue device for high-rise buildings can solve corresponding technical problems, when a dangerous situation is severe, trapped persons in the building can only wait for a fire truck for rescue, which may result in missing the best rescue opportunity; moreover, due to structural limitations, it is difficult to perform fire rescue for higher buildings that are difficult for an aerial ladder to reach. To this end, an intelligent rescue device is proposed.

Summary of the Invention

The technical task of the present invention is to provide, in view of the above deficiencies, an intelligent rescue device which, through cooperative use of a rescue cabin, a hoisting mechanism, a guide mechanism, a flexible-cable tension adjustment

mechanism, an anti-fall mechanism, a central control system and a power supply system, can quickly evacuate and rescue trapped persons in a building, thereby solving the above problems.

To achieve the above object, the present invention provides the following technical solution:

An intelligent rescue device comprises:

a rescue cabin, configured to evacuate and rescue trapped persons in a building, wherein the rescue cabin is arranged in a shaft between the building and a lift lobby;

a hoisting mechanism, configured to drive the rescue cabin to move up and down, wherein the hoisting mechanism is arranged on a roof of the building, and the rescue cabin is arranged below the hoisting mechanism;

a guide mechanism, configured to guide upward and downward movement of the rescue cabin, wherein the guide mechanism is arranged between the hoisting mechanism and a shaft ground;

a flexible-cable tension adjustment mechanism, configured to adjust a tension degree of the guide mechanism to prevent the rescue cabin from swinging, wherein the flexible-cable tension adjustment mechanism is arranged on the hoisting mechanism;

an anti-fall mechanism, configured to perform a braking operation when the rescue cabin overspeeds, wherein one anti-fall mechanism is provided at the bottom of each of both sides of the rescue cabin;

a central control system, configured to adjust an operating state or parameter of the hoisting mechanism and the anti-fall mechanism and to access a fire alarm system of the building, wherein the central control system is arranged in the building; and

a power supply system, configured to provide electric power for the hoisting mechanism, the anti-fall mechanism and the central control system, wherein the power supply system is mounted on the roof of the building.

Preferably, the hoisting mechanism comprises a fixed platform, a winch, a steel wire rope and a guide pulley. The fixed platform is mounted on the roof of the building. The winch is mounted on a top of the fixed platform. One end of the steel wire rope is fixedly wound on the winch, and another end of the steel wire rope passes through to a lower side of the fixed platform and is fixedly connected to a top of the rescue cabin by means of a rope-end assembly. The guide pulley is mounted on the top of the fixed platform and is configured to guide the steel wire rope.

The guide mechanism comprises guide flexible cables, a bracket and sliding assemblies A. One guide flexible cable is provided at each of four corners of an outer surface of the rescue cabin. The bracket is mounted on the top of the fixed platform. A top end of each guide flexible cable is fixedly hooked on the bracket, a bottom end of the bracket is fixedly connected to the shaft ground, and four corners at a top and a bottom of the rescue cabin are respectively slidably connected to the guide flexible cables by means of the sliding assemblies A.

The guide mechanism further comprises T-shaped guide rails and sliding assemblies B. Two T-shaped guide rails are provided between the fixed platform and the shaft ground. The two T-shaped guide rails are symmetrically arranged on two sides of the rescue cabin. A top end of each T-shaped guide rail is fixedly connected to the fixed platform, a bottom end of each T-shaped guide rail is fixedly connected to the shaft ground, and two sides at the top and the bottom of the rescue cabin are respectively slidably connected to the T-shaped guide rails by means of the sliding assemblies B.

The flexible-cable tension adjustment mechanism comprises a guide sleeve, clamping cores, a stop block and a locking nut. Two clamping cores are symmetrically and movably connected at an upper end of an inner cavity of the guide sleeve. The guide flexible cable movably passes between the two clamping cores. The stop block is fixedly connected to an upper end of a surface of the guide flexible cable and is configured to block the clamping cores. A diameter of a bottom end of each clamping core is smaller than a diameter of a top end thereof. The fixed platform is provided with a first through-hole for the guide flexible cable to pass through. An upper portion of an inner wall surface of the guide sleeve is provided with a receiving groove for receiving the clamping cores. An outer surface of each clamping core is slidably connected to an inner wall surface of the receiving groove. An inner wall surface of the first through-hole is slidably connected to an outer surface of the guide sleeve. The locking nut is threadedly sleeved on the outer surface of the guide sleeve, and a bottom of the locking nut is rotatably connected to the top of the fixed platform.

The anti-fall mechanism comprises a support assembly, an electric telescopic actuator, a third bracket, a braking assembly and a support seat. The support assembly is arranged on the rescue cabin. The electric telescopic actuator is arranged on a top of the support assembly. The third bracket is fixedly connected to an output end of the electric telescopic actuator. The braking assembly is movably arranged below the third bracket. The guide flexible cable movably passes through the braking assembly. The braking assembly is movably arranged in an inner cavity of the support seat. The support seat is arranged on one side of the support assembly. The rescue cabin is provided with a linear velocity sensor configured to monitor a moving speed of the rescue cabin.

The winch, the electric telescopic actuator and the linear velocity sensor are each electrically connected to the central control system. The winch, the electric telescopic actuator, the linear velocity sensor and the central control system are each electrically connected to the power supply system.

Compared with the prior art, the advantages and positive effects of the present invention are as follows:

1. In the present invention, by additionally providing the rescue cabin and the hoisting mechanism on the building, when a fire occurs, the hoisting mechanism can lower the rescue cabin suspended at a certain position on the roof of the building to a rescue-cabin landing door at a height position of a fire point of the building, so that trapped persons in the building can be evacuated and rescued by means of the rescue cabin, thereby achieving the purpose of rescuing persons. As a result, the trapped persons in the building can be rescued in time, and situations in which fire rescue is difficult due to structural limitations can be effectively avoided.

2. In the present invention, by additionally providing the guide mechanism and the flexible-cable tension adjustment mechanism between the hoisting mechanism and the shaft ground, when the rescue cabin moves up and down, the rescue cabin can be guided, so that the rescue cabin can move up and down stably and the rescue cabin is prevented from swinging and shaking.

3. In the present invention, by additionally providing the anti-fall mechanism between the rescue cabin and the guide mechanism, when the linear velocity sensor monitors that the rescue cabin has an overspeed phenomenon, the linear velocity sensor sends an electrical signal. The central control system receives the electrical signal and controls the electric telescopic actuator to start, so that the output end of the electric telescopic actuator drives the third bracket and the braking assembly to be lifted upward. Under the cooperation of the support seat, the braking assembly closes and clamps the guide flexible cable to brake the rescue cabin, thereby preventing the entire rescue cabin from falling downward and effectively avoiding secondary injury to persons in the rescue cabin.

Brief Description of the Drawings

In order to explain the embodiments of the present invention or the technical solutions in the prior art more clearly, the drawings required for use in the embodiments are briefly introduced below. It is apparent that the drawings described below are merely some embodiments of the present invention, and those of ordinary skill in the art may obtain other drawings based on these drawings without creative effort.

Fig. 1 is a schematic structural view of an intelligent rescue device according to an embodiment of the present invention;

Fig. 2 is a schematic top structural view of a rescue cabin and a hoisting mechanism of the intelligent rescue device according to an embodiment of the present invention;

Fig. 3 is a schematic sectional structural view taken along line A-A in Fig. 1 of the intelligent rescue device according to an embodiment of the present invention;

Fig. 4 is a schematic partial structural view of a guide mechanism of the intelligent rescue device according to an embodiment of the present invention;

Fig. 5 is a schematic structural view of a guide flexible cable and a flexible-cable tension adjustment mechanism of the intelligent rescue device according to an embodiment of the present invention;

Fig. 6 is a schematic structural view of a guide flexible cable and an anti-fall mechanism of the intelligent rescue device according to an embodiment of the present invention;

Fig. 7 is a schematic sectional structural view taken along line B-B in Fig. 6 of the intelligent rescue device according to an embodiment of the present invention;

Fig. 8 is a schematic structural view of the anti-fall mechanism of the intelligent rescue device according to an embodiment of the present invention in a normally-open state; and

Fig. 9 is a schematic structural view of the anti-fall mechanism of the intelligent rescue device according to an embodiment of the present invention in a braking state.

In the drawings, reference numeral 1 denotes the rescue cabin; 11 denotes the safety airbag;

reference numeral 2 denotes the hoisting mechanism; 21 denotes the fixed platform; 22 denotes the winch; 23 denotes the steel wire rope; 24 denotes the guide pulley;

reference numeral 3 denotes the guide mechanism; 31 denotes the guide flexible cable; 32 denotes the bracket; 33 denotes the sliding assembly A; 331 denotes the first mounting frame; 332 denotes the linear slider; 333 denotes the open transition slot; 34 denotes the T-shaped guide rail; 35 denotes the sliding assembly B; 351 denotes the second mounting frame; 352 denotes the pulley; 36 denotes the first bracket; 37 denotes the second bracket;

reference numeral 4 denotes the flexible-cable tension adjustment mechanism; 41 denotes the guide sleeve; 42 denotes the clamping core; 43 denotes the stop block; 44 denotes the locking nut; 45 denotes the anti-loosening nut;

reference numeral 5 denotes the anti-fall mechanism; 51 denotes the support assembly; 511 denotes the third mounting frame; 512 denotes the L-shaped plate; 52 denotes the electric telescopic actuator; 53 denotes the third bracket; 54 denotes the braking assembly; 541 denotes the brake caliper; 542 denotes the brake pad; 55 denotes the support seat;

reference numeral 6 denotes the central control system; and reference numeral 7 denotes the power supply system.

Detailed Description of Embodiments

In order that the above objects, features and advantages of the present invention can be more clearly understood, the present invention is further described below with reference to the drawings and embodiments. It should be noted that, as long as no conflict occurs, the embodiments of the present application and features in the embodiments may be combined with one another.

The present invention is further described below with reference to the drawings and specific embodiments.

Embodiment 1

As shown in Figs. 1 to 9, an intelligent rescue device according to an embodiment of the present invention comprises: a rescue cabin 1, a hoisting mechanism 2, a guide mechanism 3, a flexible-cable tension adjustment mechanism 4, an anti-fall mechanism 5, a central control system 6 and a power supply system 7.

The rescue cabin 1 is configured to evacuate and rescue trapped persons in a building, and the rescue cabin 1 is arranged in a shaft between the building and a lift lobby.

The hoisting mechanism 2 is configured to drive the rescue cabin 1 to move up and down. The hoisting mechanism 2 is arranged on a roof of the building, and the rescue cabin 1 is arranged below the hoisting mechanism 2. A safety airbag 11 is mounted on each of the top and the bottom of the rescue cabin 1. When the rescue cabin 1 falls downward, the safety airbag 11 can buffer the rescue cabin 1, so as to avoid secondary injury to persons in the rescue cabin 1.

The guide mechanism 3 is configured to guide upward and downward movement of the rescue cabin 1, and the guide mechanism 3 is arranged between the hoisting mechanism 2 and the shaft ground.

The flexible-cable tension adjustment mechanism 4 is configured to adjust a tension degree of the guide mechanism 3 to prevent the rescue cabin 1 from swinging, and the flexible-cable tension adjustment mechanism 4 is arranged on the hoisting mechanism 2.

The anti-fall mechanism 5 is configured to perform a braking operation when the rescue cabin 1 overspeeds, and one anti-fall mechanism 5 is provided at the bottom of each of both sides of the rescue cabin 1.

The central control system 6 is configured to adjust an operating state or parameter of the hoisting mechanism 2 and the anti-fall mechanism 5 and to access a fire alarm system of the building, and the central control system 6 is arranged in the building.

The power supply system 7 is configured to provide electric power for the hoisting mechanism 2, the anti-fall mechanism 5 and the central control system 6, and the power supply system 7 is mounted on the roof of the building.

Embodiment 2

As shown in Figs. 1 and 2, the intelligent rescue device provided in this embodiment differs from Embodiment 1 in that:

the hoisting mechanism 2 comprises a fixed platform 21, a winch 22, a steel wire rope 23 and a guide pulley 24. The fixed platform 21 is horizontally mounted on the roof of the building. The winch 22 is mounted on a top of the fixed platform 21. One end of the steel wire rope 23 is fixedly wound on the winch 22, and another end of the steel wire rope 23 passes through to a lower side of the fixed platform 21 and is fixedly connected to a top of the rescue cabin 1 by means of a rope-end assembly. The guide pulley 24 is mounted on the top of the fixed platform 21 and is configured to guide the steel wire rope 23. By starting the winch 22, the steel wire rope 23 can be wound and unwound, thereby enabling the rescue cabin 1 to move up and down.

Embodiment 3

As shown in Figs. 1, 3 and 4, the intelligent rescue device provided in this embodiment differs from Embodiment 2 in that:

the guide mechanism 3 comprises guide flexible cables 31, a bracket 32 and sliding assemblies A 33. One guide flexible cable 31 is provided at each of four corners of an outer surface of the rescue cabin 1. The bracket 32 is mounted on the top of the fixed platform 21. A top end of each guide flexible cable 31 is fixedly hooked

on the bracket 32. A bottom end of the bracket 32 is fixedly connected to the shaft ground. Four corners at the top and the bottom of the rescue cabin 1 are respectively slidably connected to the guide flexible cables 31 by means of the sliding assemblies A 33. When the rescue cabin 1 is driven by the hoisting mechanism 2 to move up and down, the guide flexible cables 31 can guide the rescue cabin 1 and prevent the rescue cabin 1 from shaking during upward and downward movement, which helps improve the stability of the rescue cabin 1 during upward and downward movement.

The guide mechanism 3 further comprises T-shaped guide rails 34 and sliding assemblies B 35. Two T-shaped guide rails 34 are provided between the fixed platform 21 and the shaft ground. The two T-shaped guide rails 34 are symmetrically arranged on two sides of the rescue cabin 1. A top end of each T-shaped guide rail 34 is fixedly connected to the fixed platform 21, and a bottom end of each T-shaped guide rail 34 is fixedly connected to the shaft ground. Two sides at the top and the bottom of the rescue cabin 1 are respectively slidably connected to the T-shaped guide rails 34 by means of the sliding assemblies B 35. When the rescue cabin 1 is driven by the hoisting mechanism 2 to move up and down, the T-shaped guide rails 34 can further guide the rescue cabin 1 and can further improve the stability of the rescue cabin 1 during upward and downward movement.

Each sliding assembly A 33 comprises a first mounting frame 331 mounted on the rescue cabin 1. A linear slider 332 is mounted on a side of the first mounting frame 331 close to the guide flexible cable 31. An inner cavity of the linear slider 332 is provided with a second through-hole for the guide flexible cable 31 to pass through. When the rescue cabin 1 drives the sliding assembly A 33 to move up and down, the linear slider 332 can slide on the surface of the guide flexible cable 31, so as to implement guidance.

Each sliding assembly B 35 comprises a second mounting frame 351 mounted on the rescue cabin 1. One side of the second mounting frame 351 is rotatably connected to three pulleys 352 slidably connected to the T-shaped guide rail 34. Two of the pulleys 352 are symmetrically arranged about a centre of the T-shaped guide rail 34, and a centre line of the other pulley 352 and a centre line of the T-shaped guide rail 34 are in the same plane. When the rescue cabin 1 drives the sliding assembly B 35 to move up and down, the pulleys 352 can roll on a surface of the T-shaped guide rail 34, so as to implement guidance.

A plurality of first brackets 36, which are regularly distributed up and down and used for support, are fixedly connected between the T-shaped guide rails 34 and the building. A plurality of second brackets 37, which are regularly distributed up and down and used for support, are fixedly connected between the two guide flexible cables 31 close to the building and the building. The first brackets 36 and the second

brackets 37 are arranged at intervals. The first brackets 36 can provide auxiliary support for the T-shaped guide rails 34, and the second brackets 37 can provide auxiliary support for the two guide flexible cables 31 close to the building, which helps improve the support stability of the first brackets 36 and the two guide flexible cables 31 close to the building.

A side of the linear slider 332 close to the second bracket 37 is provided with an open transition slot 333 communicating with the second through-hole, and a diameter of the second through-hole is adapted to the second bracket 37. This effectively avoids the phenomenon that the second bracket 37 blocks the linear slider 332, so as to ensure that the linear slider 332 can normally move up and down on the surface of the guide flexible cable 31.

Embodiment 4

As shown in Figs. 1 and 5, the intelligent rescue device provided in this embodiment differs from Embodiment 3 in that:

the flexible-cable tension adjustment mechanism 4 comprises a guide sleeve 41, clamping cores 42, a stop block 43 and a locking nut 44. Two clamping cores 42 are symmetrically and movably connected at an upper end of an inner cavity of the guide sleeve 41. The guide flexible cable 31 movably passes between the two clamping cores 42. The stop block 43 is fixedly connected to an upper end of a surface of the guide flexible cable 31 and is configured to block the clamping cores 42, so as to limit an upward movement space of the clamping cores 42. A diameter of a bottom end of each clamping core 42 is smaller than a diameter of a top end thereof, so that, when the guide sleeve 41 moves upward, the guide sleeve 41 can drive the two clamping cores 42 to be forced to move toward each other and clamp the guide flexible cable 31.

The fixed platform 21 is provided with a first through-hole for the guide flexible cable 31 to pass through. An upper portion of an inner wall surface of the guide sleeve 41 is provided with a receiving groove for receiving the clamping cores 42. An outer surface of each clamping core 42 is slidably connected to an inner wall surface of the receiving groove. An inner wall surface of the first through-hole is slidably connected to an outer surface of the guide sleeve 41. The locking nut 44 is threadedly sleeved on the outer surface of the guide sleeve 41. A bottom of the locking nut 44 is rotatably connected to the top of the fixed platform 21 by a bearing. By rotating the locking nut 44, under the action of threads, the guide sleeve 41 can be driven to move upward, and ultimately the guide flexible cable 31 can be pulled upward and tightened, thereby adjusting the tension of the guide flexible cable 31.

An anti-loosening nut 45 is threadedly sleeved on the outer surface of the guide sleeve 41. The anti-loosening nut 45 is arranged above the locking nut 44. The anti-loosening nut 45 can ensure that, under vibration, the locking nut 44 does not loosen or lose its fastening property.

Embodiment 5

As shown in Figs. 1, 6, 7, 8 and 9, the intelligent rescue device provided in this embodiment differs from Embodiment 4 in that:

the anti-fall mechanism 5 comprises a support assembly 51, an electric telescopic actuator 52, a third bracket 53, a braking assembly 54 and a support seat 55. The support assembly 51 is arranged on the rescue cabin 1. The electric telescopic actuator 52 is arranged on a top of the support assembly 51. The third bracket 53 is fixedly connected to an output end of the electric telescopic actuator 52. The braking assembly 54 is movably arranged below the third bracket 53. The guide flexible cable 31 movably passes through the braking assembly 54. The braking assembly 54 is movably arranged in an inner cavity of the support seat 55. The support seat 55 is arranged on one side of the support assembly 51. The rescue cabin 1 is provided with a linear velocity sensor configured to monitor a moving speed of the rescue cabin 1. The linear velocity sensor may be a linear velocity sensor of model PC420VP-05. By starting the electric telescopic actuator 52, the braking assembly 54 can be lifted upward, so that the braking assembly 54 closes and clamps the guide flexible cable 31 to brake the rescue cabin 1, thereby preventing the entire rescue cabin 1 from falling downward.

The support assembly 51 comprises a third mounting frame 511 fixedly connected to the rescue cabin 1. A top of the third mounting frame 511 is fixedly connected to an L-shaped plate 512. The electric telescopic actuator 52 is mounted on a bottom of an inner wall surface of the L-shaped plate 512. The support seat 55 is fixedly connected to one side of an outer surface of the L-shaped plate 512. The support assembly 51 can form a mounting base for the electric telescopic actuator 52 and the support seat 55.

The braking assembly 54 comprises one brake caliper 541 respectively and movably connected to each of two sides of an inner cavity of the support seat 55, each brake caliper 541 having a wedge-shaped structure. Brake pads 542 are fixedly connected to opposite sides of the two brake calipers 541. An inclined surface of each brake caliper 541 is slidably connected, along an inclined direction, to an inner wall surface of the support seat 55. One side of each brake caliper 541 is horizontally and slidably connected to the third bracket 53. When the third bracket 53 drives the braking assembly 54 to move upward, the brake calipers 541 can slide on the inner wall surface of the support seat 55, so that the two brake calipers 541 in the inner

cavity of the support seat 55 can move toward each other, thereby achieving the purpose of closing. A rubber pad is bonded to an inner wall surface of each brake pad 542, which can increase a friction force between the brake pad 542 and the guide flexible cable 31 and helps improve the stability of the braking assembly 54 when it closes.

The winch 22, the electric telescopic actuator 52 and the linear velocity sensor are each electrically connected to the central control system 6. The winch 22, the electric telescopic actuator 52, the linear velocity sensor and the central control system 6 are each electrically connected to the power supply system 7.

The working principle of the present invention is briefly described below:

Rescuing trapped persons: the winch 22 is started, and the winch 22 performs winding or unwinding of the steel wire rope 23. At this time, the rescue cabin 1 is driven to move upward or downward. The rescue cabin 1 drives the sliding assemblies A 33 and the sliding assemblies B 35 to move synchronously, so that the linear sliders 332 slide on the surfaces of the guide flexible cables 31 and the pulleys 352 roll on the surfaces of the T-shaped guide rails 34, until the rescue cabin 1 moves to a height position of a fire point. Then the rescue-cabin landing door of the building is opened, so that trapped persons in the building can be evacuated and rescued by means of the rescue cabin 1, thereby completing rescue of the trapped persons.

When the rescue cabin 1 operates normally, the braking assembly 54 is in a normally-open state. When the linear velocity sensor detects that the rescue cabin 1 has an overspeed phenomenon, the linear velocity sensor sends an electrical signal. The central control system 6 receives the electrical signal and controls the electric telescopic actuator 52 to start. The output end of the electric telescopic actuator 52 drives the third bracket 53, the brake calipers 541 and the brake pads 542 to move upward synchronously. The brake calipers 541 slide in the inner cavity of the support seat 55, and the brake calipers 541 drive the brake pads 542 to move synchronously, so that the two brake pads 542 in the inner cavity of the support seat 55 move toward each other. Thus, the braking assembly 54 closes and clamps the guide flexible cable 31 to brake the rescue cabin 1, thereby preventing the entire rescue cabin 1 from falling downward.

Adjusting the tension of the guide flexible cable 31: the locking nut 44 is rotated. Under the action of threads, the locking nut 44 drives the guide sleeve 41 to move upward in the inner cavity of the first through-hole, so that the two clamping cores 42 in the inner cavity of the guide sleeve 41 are forced to move toward each other and clamp the guide flexible cable 31. The locking nut 44 is further rotated, so that the guide sleeve 41 continues to move upward. Under the limiting and blocking action of the stop block 43, the guide sleeve 41 drives the clamping cores 42 to move upward

synchronously, and the clamping cores 42 pull the guide flexible cable 31 upward and tighten it, thereby completing adjustment of the tension of the guide flexible cable 31.

In summary, in this intelligent rescue device, by additionally providing the rescue cabin 1 and the hoisting mechanism 2 on the building, when a fire occurs, the hoisting mechanism 2 can lower the rescue cabin 1 suspended at a certain position on the roof of the building to a rescue-cabin landing door at a height position of a fire point of the building. Thus, trapped persons in the building can be evacuated and rescued by means of the rescue cabin 1, thereby achieving the purpose of rescuing persons. The trapped persons in the building can be rescued in time, and situations in which fire rescue is difficult due to structural limitations can be effectively avoided.

By additionally providing the guide mechanism 3 and the flexible-cable tension adjustment mechanism 4 between the hoisting mechanism 2 and the shaft ground, when the rescue cabin 1 moves up and down, the rescue cabin 1 can be guided, so that the rescue cabin 1 can move up and down stably and the rescue cabin 1 is prevented from swinging and shaking.

By additionally providing the anti-fall mechanism 5 between the rescue cabin 1 and the guide mechanism 3, when the linear velocity sensor monitors that the rescue cabin 1 has an overspeed phenomenon, the linear velocity sensor sends an electrical signal. The central control system 6 receives the electrical signal and controls the electric telescopic actuator 52 to start, so that the output end of the electric telescopic actuator 52 drives the third bracket 53 and the braking assembly 54 to be lifted upward. Under the cooperation of the support seat 55, the braking assembly 54 closes and clamps the guide flexible cable 31 to brake the rescue cabin 1, thereby preventing the entire rescue cabin 1 from falling downward and effectively avoiding secondary injury to persons in the rescue cabin 1.

Through the above specific embodiments, those skilled in the art can readily implement the present invention. However, it should be understood that the present invention is not limited to the above specific embodiments. On the basis of the disclosed embodiments, those skilled in the art may arbitrarily combine different technical features to implement different technical solutions.

Claims

1. An intelligent rescue device, comprising:

a rescue cabin (1), configured to evacuate and rescue trapped persons in a building, wherein the rescue cabin (1) is arranged in a shaft between the building and a lift lobby;

a hoisting mechanism (2), configured to drive the rescue cabin (1) to move up and down, wherein the hoisting mechanism (2) is arranged on a roof of the building, and the rescue cabin (1) is arranged below the hoisting mechanism (2);

a guide mechanism (3), configured to guide upward and downward movement of the rescue cabin (1), wherein the guide mechanism (3) is arranged between the hoisting mechanism (2) and a shaft ground;

a flexible-cable tension adjustment mechanism (4), configured to adjust a tension degree of the guide mechanism (3) to prevent the rescue cabin (1) from swinging, wherein the flexible-cable tension adjustment mechanism (4) is arranged on the hoisting mechanism (2);

an anti-fall mechanism (5), configured to perform a braking operation when the rescue cabin (1) overspeeds, wherein one anti-fall mechanism (5) is provided at the bottom of each of both sides of the rescue cabin (1);

a central control system (6), configured to adjust an operating state or parameter of the hoisting mechanism (2) and the anti-fall mechanism (5) and to access a fire alarm system of the building, wherein the central control system (6) is arranged in the building; and

a power supply system (7), configured to provide electric power for the hoisting mechanism (2), the anti-fall mechanism (5) and the central control system (6), wherein the power supply system (7) is mounted on the roof of the building.

2. The device according to claim 1, wherein the hoisting mechanism (2) comprises a fixed platform (21), a winch (22), a steel wire rope (23) and a guide pulley (24), wherein the fixed platform (21) is mounted on the roof of the building, the winch (22) is mounted on a top of the fixed platform (21), one end of the steel wire rope (23) is fixedly wound on the winch (22), another end of the steel wire rope (23) passes through to a lower side of the fixed platform (21) and is fixedly connected to a top of the rescue cabin (1) by means of a rope-end assembly, and the guide pulley (24) is

mounted on the top of the fixed platform (21) and is configured to guide the steel wire rope (23).

3. The device according to claim 1, wherein the guide mechanism (3) comprises guide flexible cables (31), a bracket (32) and sliding assemblies A (33), wherein one guide flexible cable (31) is provided at each of four corners of an outer surface of the rescue cabin (1), the bracket (32) is mounted on a top of the fixed platform (21), a top end of each guide flexible cable (31) is fixedly hooked on the bracket (32), a bottom end of the bracket (32) is fixedly connected to the shaft ground, and four corners at a top and a bottom of the rescue cabin (1) are respectively slidably connected to the guide flexible cables (31) by means of the sliding assemblies A (33).

4. The device according to claim 2, wherein the guide mechanism (3) further comprises T-shaped guide rails (34) and sliding assemblies B (35), wherein two T-shaped guide rails (34) are provided between the fixed platform (21) and the shaft ground, the two T-shaped guide rails (34) are symmetrically arranged on two sides of the rescue cabin (1), a top end of each T-shaped guide rail (34) is fixedly connected to the fixed platform (21), a bottom end of each T-shaped guide rail (34) is fixedly connected to the shaft ground, and two sides at the top and the bottom of the rescue cabin (1) are respectively slidably connected to the T-shaped guide rails (34) by means of the sliding assemblies B (35).

5. The device according to claim 4, wherein the flexible-cable tension adjustment mechanism (4) comprises a guide sleeve (41), clamping cores (42), a stop block (43) and a locking nut (44), wherein two clamping cores (42) are symmetrically and movably connected at an upper end of an inner cavity of the guide sleeve (41), the guide flexible cable (31) movably passes between the two clamping cores (42), and the stop block (43) is fixedly connected to an upper end of a surface of the guide flexible cable (31) and is configured to block the clamping cores (42).

6. The device according to claim 5, wherein a diameter of a bottom end of each clamping core (42) is smaller than a diameter of a top end thereof, the fixed platform (21) is provided with a first through-hole for the guide flexible cable (31) to pass through, and an upper portion of an inner wall surface of the guide sleeve (41) is provided with a receiving groove for receiving the clamping cores (42).

7. The device according to claim 6, wherein an outer surface of each clamping core (42) is slidably connected to an inner wall surface of the receiving groove, an inner wall surface of the first through-hole is slidably connected to an outer surface of the guide sleeve (41), the locking nut (44) is threadedly sleeved on the outer surface of

the guide sleeve (41), and a bottom of the locking nut (44) is rotatably connected to the top of the fixed platform (21).

8. The device according to claim 2, wherein the anti-fall mechanism (5) comprises a support assembly (51), an electric telescopic actuator (52), a third bracket (53), a braking assembly (54) and a support seat (55), wherein the support assembly (51) is arranged on the rescue cabin (1), the electric telescopic actuator (52) is arranged on a top of the support assembly (51), the third bracket (53) is fixedly connected to an output end of the electric telescopic actuator (52), and the braking assembly (54) is movably arranged below the third bracket (53).

9. The device according to claim 2, wherein the guide flexible cable (31) movably passes through the braking assembly (54), the braking assembly (54) is movably arranged in an inner cavity of the support seat (55), the support seat (55) is arranged on one side of the support assembly (51), and the rescue cabin (1) is provided with a linear velocity sensor configured to monitor a moving speed of the rescue cabin (1).

10. The device according to claim 2, wherein the winch (22), the electric telescopic actuator (52) and the linear velocity sensor are each electrically connected to the central control system (6), and the winch (22), the electric telescopic actuator (52), the linear velocity sensor and the central control system (6) are each electrically connected to the power supply system (7).