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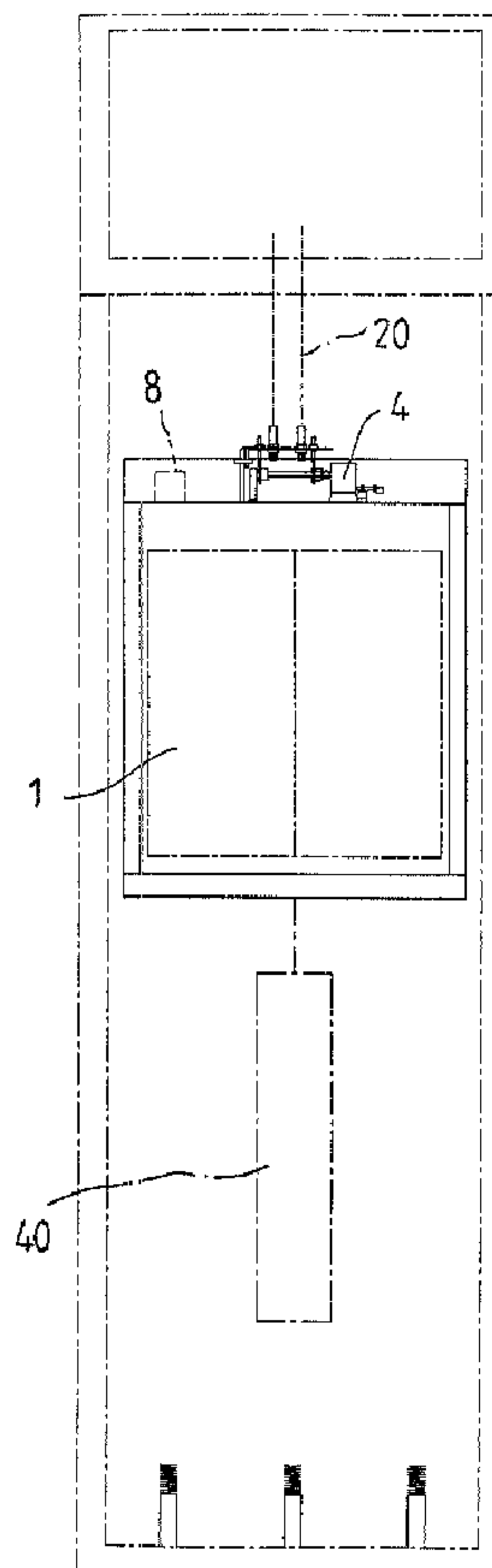
(72) Inventeur/Inventor:
CHEN, YUNG-HSIN, TW

(73) Propriétaire/Owner:
CHEN, YUNG-HSIN, TW

(74) Agent: ADE & COMPANY

(54) Titre : DISPOSITIF DE DEPLACEMENT D'URGENCE D'ASCENSEUR

(54) Title: EMERGENCY MOVING DEVICE OF AN ELEVATOR



(57) Abrégé/Abstract:

An emergency moving device of an elevator includes a main moving gear and a reduction gear, both disposed on the top of the elevator car. Chains are passed under a respective one of several gears connected to shafts of the reduction gear. The chains are connected to a first connector, which is disposed above the car, and is connected to steel ropes of the car. When a breakdown of



(57) **Abrégé(suite)/Abstract(continued):**

the elevator causes the car to stop between two of the floors, the passengers can, control an emergency power supply to activate. A fall prevention member to free the carriage from the first connector for permitting the carriage to move down relative to the first connector; the emergency power also activates a braking switch of the main gear for same to turn in order to drive the reduction gear and the gears connected to the chains for lowering the car.

ABSTRACT

An emergency moving device of an elevator includes a main moving gear and a reduction gear, both disposed on the top of the elevator car. Chains are passed under a respective one of several gears connected to shafts of the reduction gear. The chains are connected to a first connector, which is disposed above the car, and is connected to steel ropes of the car. When a breakdown of the elevator causes the car to stop between two of the floors, the passengers can, control an emergency power supply to activate. A fall prevention member to free the carriage from the first connector for permitting the carriage to move down relative to the first connector; the emergency power also activates a braking switch of the main gear for same to turn in order to drive the reduction gear and the gears connected to the chains for lowering the car.

EMERGENCY MOVING DEVICE OF AN ELEVATOR

The present invention relates to an emergency moving device of an elevator which can help the car member of the elevator to move up or down to a next floor of the building when breakdown or power failure causes the car member to
5 stop between the floors.

BACKGROUND OF THE INVENTION

A conventional elevator shown and described in more detail hereinafter has a car member, steel ropes, a main motor and a balance weight.

The carriage member is received in the longitudinal passage of the
10 building. The steel ropes are connected to a top of the car member from one end, and passed around the main motor. The balance weight is connected to the other ends of the steel ropes.

Then, the car member 10 can be moved up and down along the longitudinal passage to transport people from one floor to another.

15 However, the motor will stop running to prevent the car member from falling down in case of power failure or breakdown. Consequently, the car member stops between two adjacent one of the floors, and the passengers cannot get off same safely until the breakdown or power failure is handled, i.e. the passengers usually have to wait anxiously in the car member a relatively long time until the
20 breakdown or power failure is fixed.

SUMMARY OF THE INVENTION

Therefore, it is a main object of the present invention to provide an emergency device to an elevator such that the member of the elevator can be

moved to a next floor for the passengers to get off the elevator without delay after the power failure or breakdown.

According to the invention there fore there is provided an emergency moving device of an elevator having a car member and support cables for the car member for moving the car member along a direction of movement, the device
5 comprising:

a first gear arranged to be disposed on a top of said car member of the elevator;

a reduction gear arranged to be disposed on top of said car member
10 and coupled to said main moving gear;

a plurality of chain wheels coupled to said reduction gear for imparting a turning movement to said reduction gear and thereby driving said first gear;

a first connecting member arranged to be coupled to said support cables of the elevator for vertically displacing the car member;

15 a second connecting member arranged to be affixed to the car member and coupled to said first connecting member for relative movement therebetween along the direction of movement;

a fall prevention device operable to lock the first and second connecting members against said relative movement and to release the first and
20 second connecting members to permit said relative movement;

a plurality of chains each being connected at one end thereof to said first connecting member and each engaging a respective one of said plurality of gears such that relative movement of the first connecting member and the car

member causes the chains to drive said plurality of gears;

a braking member releasably engagable with said first gear for blocking and unblocking rotation of said first gear:

and a hydraulic governor coupled to said first gear for governing a rate
5 of rotation thereof;

said braking member and said fall prevention device being arranged so as to be operable such that, when the car member is stopped between floors by a power failure, said fall prevention device releases said first connecting member and said second connecting member for said relative movement and said braking
10 member releases said first gear to thereby lower the car member relative to said first connecting member by displacement of said plurality of chain wheels at a rate controlled by said hydraulic governor, said displacement of said plurality of chains driving said plurality of gears to rotate, said first gear being driven to rotate against a resistance provided by said hydraulic governor through rotation of said reduction
15 gear responsive to said rotation of said plurality of chain wheels.

The chains are passed under a respective one of the chain wheels, and connected to a bottom of a first connecting member, which is fixedly connected to steel ropes of the elevator, for permitting the gears to turn to make the car move downwards relative to the first connecting member when the passenger in the car
20 member control an emergency power supply for same to activate a fall prevention member to free the car from the first connecting member for permitting the car member to move down relative to the first connecting member, and activate a braking switch of the main moving gear for permitting the main gear to turn in a

breakdown of the elevator causing the car member to stop between two adjacent ones of the floors of the building. A position sensor is provided to make the fall prevention member move to a locking position to stop the member from moving relative to the first connecting member, and make the locking switch stop the main moving gear from turning when the car is moved downwards to a lower one of the adjacent floors in the breakdown of the elevator.

BRIEF DESCRIPTION OF THE DRAWINGS

This invention will be better understood by referring to the accompanying drawings, wherein:

10 Fig. 1 is a front view of an elevator having the emergency moving device of the present invention.

Fig. 2 is a side view of the elevator having the emergency moving device of the present invention.

15 Fig. 3 is a fragmentary front view of the emergency moving device of an elevator according to the present invention.

Fig. 4 is a fragmentary side view of the emergency moving device of an elevator in Fig. 3.

Fig. 5 is a side view of the elevator in Fig. 2 with the car being lowered to a nearest floor in breakdown of the elevator.

20 Fig. 6 is a fragmentary front view of the emergency moving device of the present invention, working in the emergency.

Fig. 7 is a fragmentary side view of the emergency moving device of the present invention, working in the emergency.

Fig. 8 is a side view of a conventional elevator as described in the background.

DETAILED DESCRIPTION OF THE PRIOR ART AND PREFERRED EMBODIMENT

5 In Fig. 8 is shown a conventional elevator which has a car member 10, steel ropes 20, a main motor 30 and a balance weight.

The carriage member 10 is received in the longitudinal passage of the building. The steel ropes 20 are connected to a top of the car member 10 from one end, and passed around the main motor 30. The balance weight 40 is connected to
10 the other ends of the steel ropes 30.

Then, the car member 10 can be moved up and down along the longitudinal passage to transport people from one floor to another.

However, the motor 30 will stop running to prevent the car member 10 from falling down in case of power failure or breakdown. Consequently, the car
15 member 10 stops between two adjacent one of the floors, and the passengers cannot get off same safely until the breakdown or power failure is handled, i.e. the passengers usually have to wait anxiously in the car member 10 a relatively long time until the breakdown or power failure is fixed.

Referring to Figs. 1, 2, 3 and 4, an elevator is provided with the
20 emergency moving device of the present invention. The elevator includes a member 1, steel ropes 20, a main motor 30 and a balance weight 40. The steel ropes 20 are passed around the main motor 30, and each connected to the balance weight 40 from one end, The member is received in a longitudinal passage of a building.

The emergency moving device includes a first connecting member 13, a second connecting member 11, an oil hydraulic cylinder 6, several chains 2, chain wheels 3, a main moving gear 5, a fall prevention device 12, a reduction gear 4, a braking switch 7, an emergency power supply 8 and positioning sensors 9 (Fig. 5).

5 The first connecting member 13 is movably disposed above the car member 1, and connected to the other ends of the steel ropes 20 from the upper side. The first connecting member 13 is connected to first ends of the chains 2 from the lower side.

The chain wheels 3 are connected to shafts (not numbered) of the
10 reduction gear 4, which is fixedly disposed on the top of the car member 1. The oil hydraulic cylinder 6 is also fixedly disposed on the top of the car member 1, and has oil return pipe 62, a governor valve 63 and a moving toothed bar 61. The moving toothed bar 61 has engaging teeth (not numbered) formed along the upper side, and engages both the main moving gear 5 and a main gear (not shown) of the reduction
15 gear 4. The main moving gear 5 is electrically connected to the braking switch 7. And, the emergency power supply 8 is electrically connected to the braking switch 7.

The chains 2 each passes under a respective one of the gears 3, and the opposite ends of the chains are wound around reels or other storing equipments. The second connecting member 11 is fixedly disposed on the top of the car member
20 1, and the first connecting member 13 further has a lateral portion sticking down from the horizontal portion; the fall prevention device 12 has a securing oil hydraulic cylinder 121 having a piston rod 1211 capable of passing through holes of both the first and the second connecting members 13 and 11 to prevent one from moving

relative to the other as shown in Fig. 3. That is the car member 1 is stopped from moving relative to the first connecting member 13 by means of the piston rod 1211 of the securing hydraulic cylinder 121 when the elevator is working normally. The fall prevention device 12 further has an oil container 123, and an oil drain valve 122
5 for controlling the movement of the piston rod 1211.

Positioning sensors 9 are disposed above 1 a respective one of elevator passage doors in the floors of the building. And, the car member 1 has an emitting device (not numbered) disposed above the door thereof, and an emergency control button (not shown) disposed in the member 1.

10 When the car member 1 is forced to stop between two adjacent one of the floors of the building due to power failure or breakdown of the elevator, the passengers in the member 1 push the emergency button in the car 1 to activate the emergency power supply 8.

The oil drain valve 122 is opened for permitting oil to flow into the oil
15 container 123 from the securing cylinder 121 so that the piston rod 1211 separates from the first and the second connecting members 13 and 11 for permitting the car member 1 to move relative to the first connecting member 11.

At the same time, the braking switch 7 is activated to free the main moving gear 5 from a locking position so that the same can turn. When turning, the
20 main moving gear 5 makes the moving toothed bar 61 moves along. Consequently, the chain wheels 3 connected to the shafts of the reduction gear 4 are turned for permitting the car member 1 to move down to the nearest floor from between the two adjacent floors.

The governor valve 63 is connected to the oil return pipe 62, which is connected to the main body of the oil hydraulic cylinder 6, such that speed of the moving toothed bar 61 can be adjusted by means of the governor valve 63.

When the member 1 is moved down to the next floor after the emergency moving device is activated, the emitting device faces the positioning sensor 9 of that floor, and the positioning sensor 9 causes the braking switch 7 to stop the main moving gear 5 from turning. Thus, the passengers in the car member 1 can easily and safely get off same.

When the power failure or breakdown of the elevator is fixed, the gears 3 are turned in the opposite direction, and the chains 6 wind back around the reels for reducing the space between the car member 1 and the first connecting member 13 to a proper one. And the piston rod 1211 passes through the holes of the connecting member 11 and 13 to prevent the car member from moving relative to the first connecting member 13.

From the above description, the emergency moving device of an elevator according to the present invention can be known to be able to lower the car member to a next floor exactly and without delay after a breakdown or power failure of the elevator such that the passengers can get off the elevator safely and easily without having to suffer from waiting a long time.

CLAIMS:

1. An emergency moving device of an elevator having a car member and support cables for the car member for moving the car member along a direction of movement, the device comprising:

5 a first gear arranged to be disposed on a top of said car member of the elevator;

a reduction gear arranged to be disposed on top of said car member and coupled to said main moving gear;

10 a plurality of chain wheels coupled to said reduction gear for imparting a turning movement to said reduction gear and thereby driving said first gear;

a first connecting member arranged to be coupled to said support cables of the elevator for vertically displacing the car member;

15 a second connecting member arranged to be affixed to the car member and coupled to said first connecting member for relative movement therebetween along the direction of movement;

a fall prevention device operable to lock the first and second connecting members against said relative movement and to release the first and second connecting members to permit said relative movement;

20 a plurality of chains each being connected at one end thereof to said first connecting member and each engaging a respective one of said plurality of chain wheels such that relative movement of the first connecting member and the car member causes the chains to drive said plurality of chain wheels;

a braking member releasably engagable with said first gear for

blocking and unblocking rotation of said first gear:

and a hydraulic governor coupled to said first gear for governing a rate of rotation thereof;

said braking member and said fall prevention device being arranged so
5 as to be operable such that, when the car member is stopped between floors by a power failure, said fall prevention device releases said first connecting member and said second connecting member for said relative movement and said braking member releases said first gear to thereby lower the car member relative to said first connecting member by displacement of said plurality of chains at a rate controlled by
10 said hydraulic governor, said displacement of said plurality of chains driving said plurality of chain wheels to rotate, said first gear being driven to rotate against a resistance provided by said hydraulic governor through rotation of said reduction gear responsive to said rotation of said plurality of chain wheels.

2. The emergency moving device of an elevator as Claimed in
15 Claim 1, wherein free portions of said plurality of chains are respectively wound around storing equipment.

3. The emergency moving device of an elevator as Claimed in Claim 1 or 2, wherein said fall prevention device includes an oil hydraulic cylinder having a piston rod removably passing through respective holes formed in each of
20 said first and second connecting members for releasably coupling said first connecting member to said second connecting member.

4. The emergency moving device of an elevator as Claimed in Claim 1, 2 or 3, wherein said hydraulic governor includes a moving toothed bar

engaged with said first gear.

5 5. The emergency moving device of an elevator as Claimed in Claim 4, wherein said hydraulic governor further includes a hydraulic cylinder connected to said toothed bar, said hydraulic cylinder including an oil return pipe, and a governor valve coupled in fluid communication with said oil return pipe for adjusting a displacement rate of said toothed bar engaging said first gear.

10 6. The emergency moving device of an elevator as Claimed in any one of Claims 1 to 5, further comprising a positioning sensor for detecting a predetermined position of the car member, said braking member being arranged to be operated, in response to the predetermined position of the car member being detected by said positioning sensor, to block said first gear from turning when said car is lowered to said predetermined position.

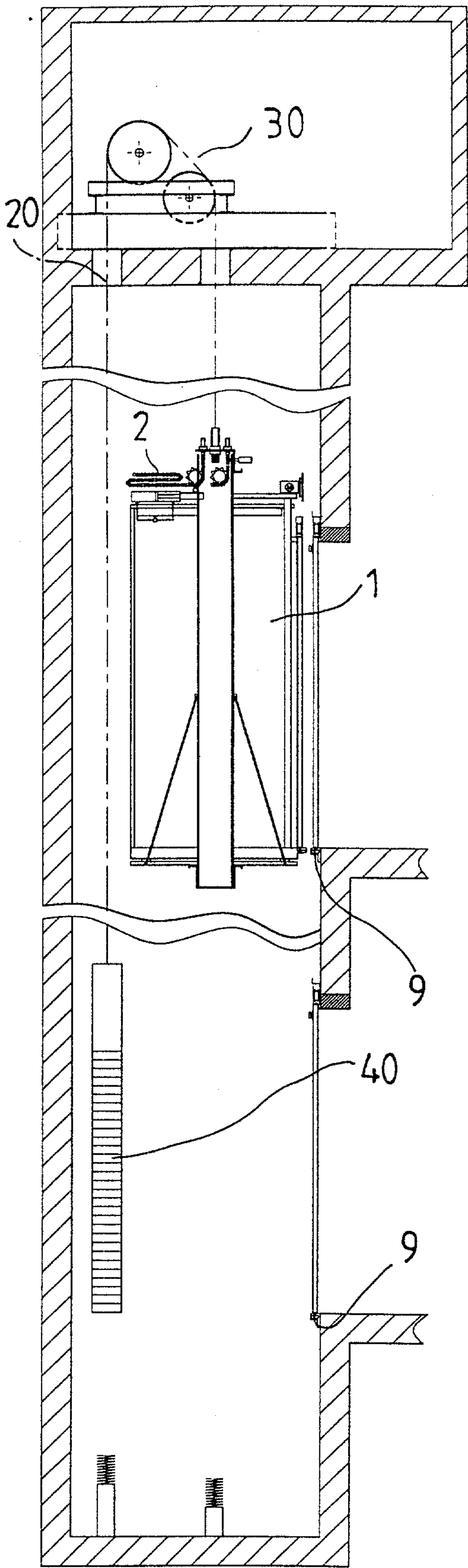
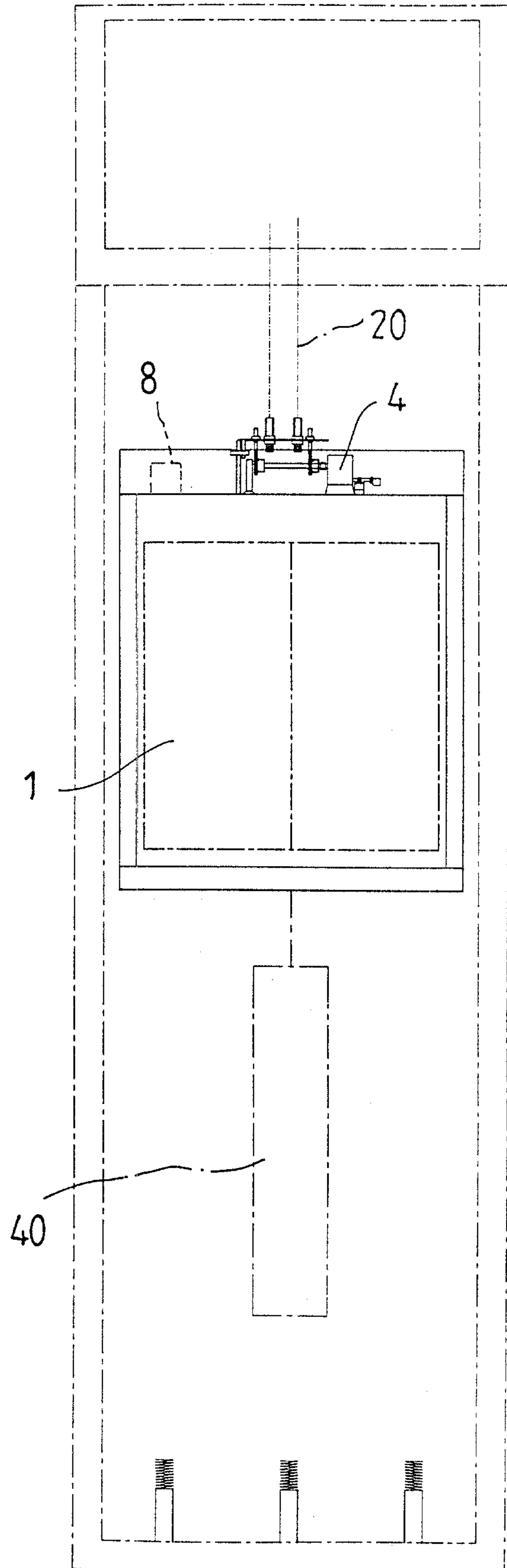


FIG. 2



INVENTOR: FIG. 1
YUNG-HSIN CHEN
PER:
ADE & COMPANY

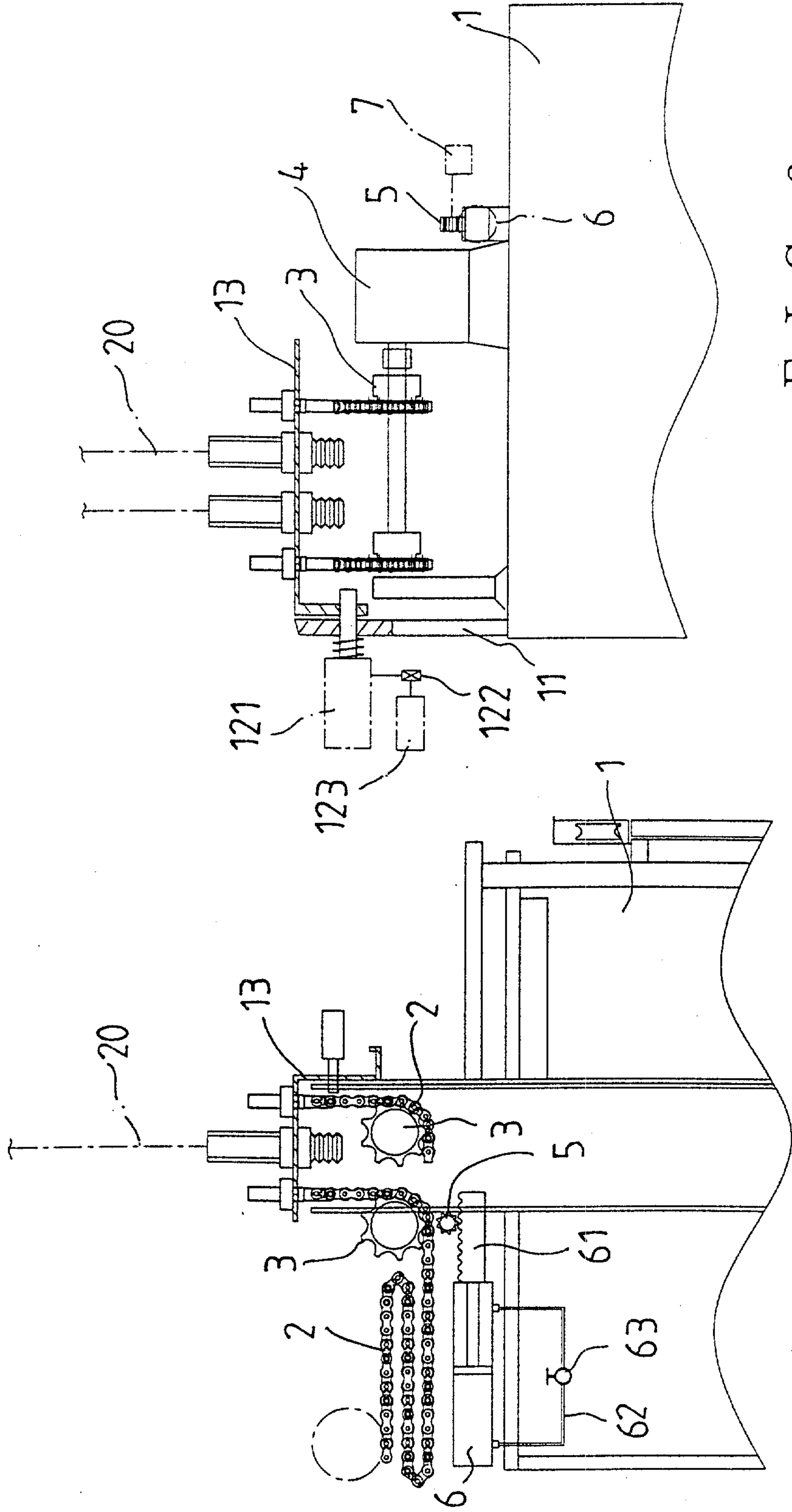


FIG. 3

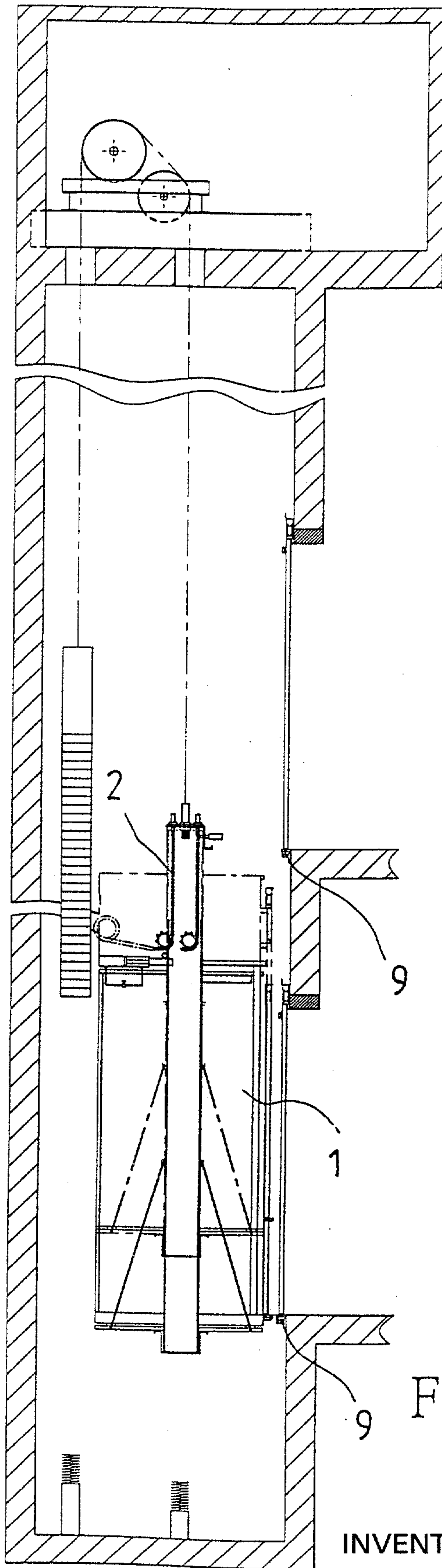
FIG. 4

INVENTOR:

YUNG-HSIN CHEN

PER:

ADE & COMPANY



9 FIG. 5

INVENTOR:

YUNG-HSIN CHEN

PER:

ADE & COMPANY

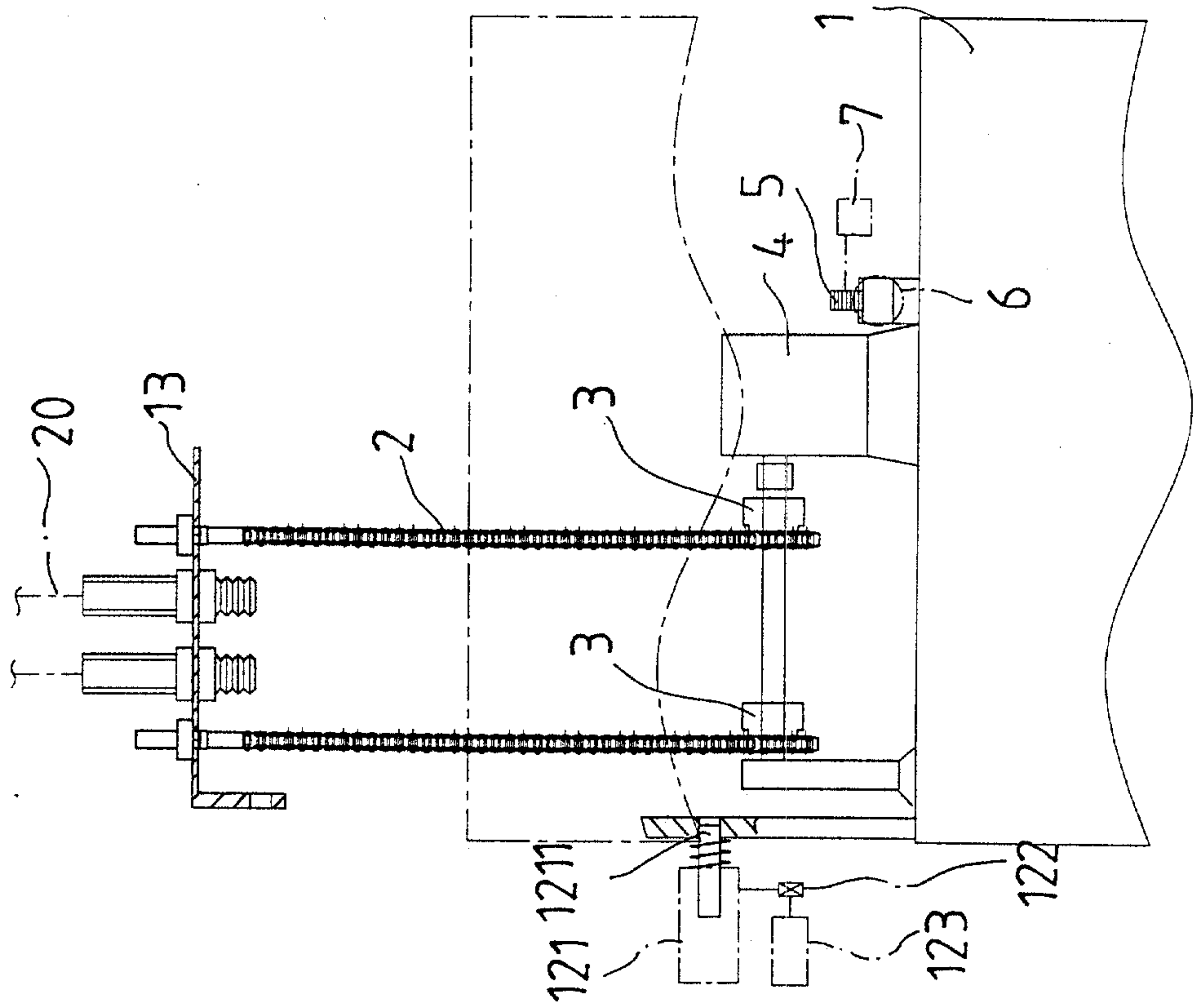


FIG. 6

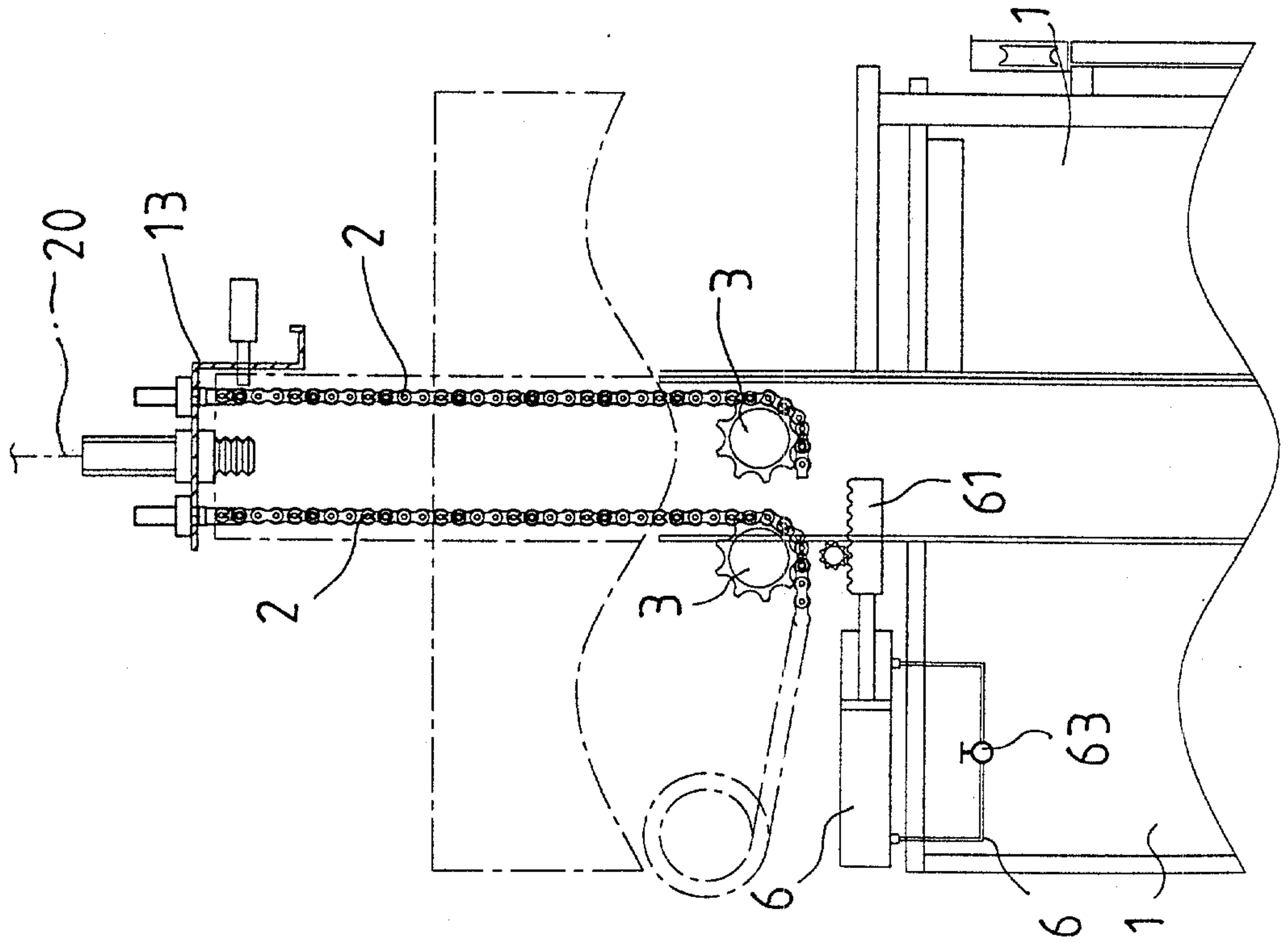


FIG. 7

INVENTOR:

YUNG-HSIN CHEN

PER:

ADE & COMPANY

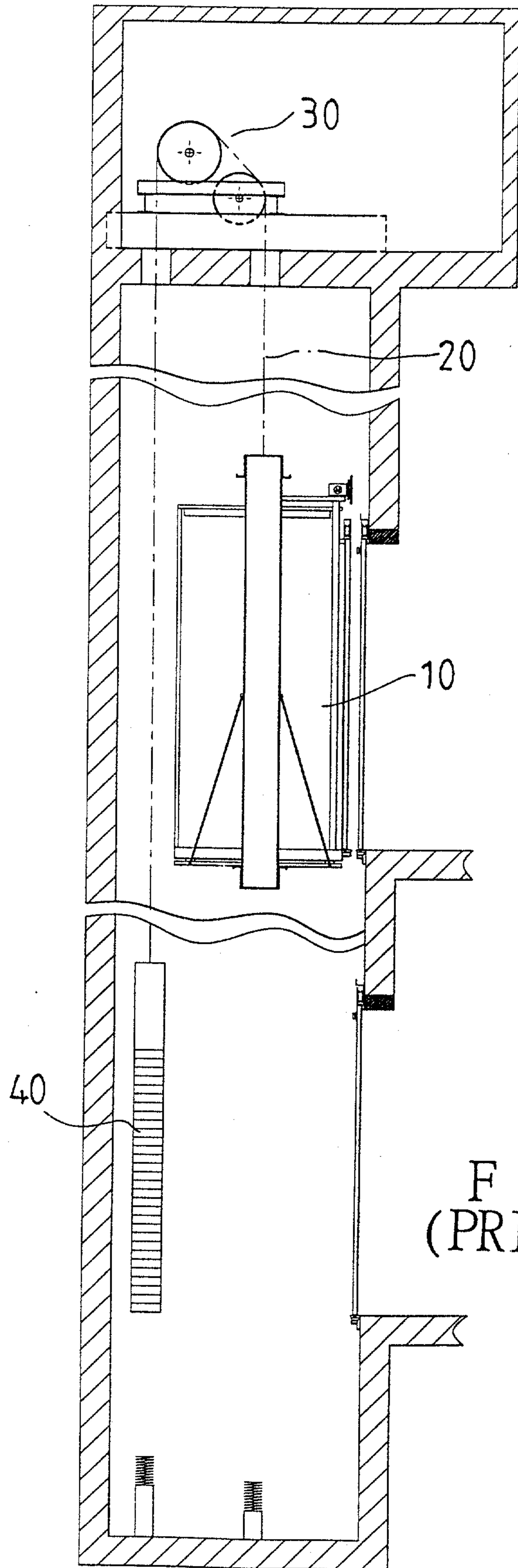


FIG. 8
(PRIOR ART)

INVENTOR:

YUNG-HSIN CHEN

PER:

ADE & COMPANY

