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(54) Arrangement for mounting the hydraulic cylinder of an elevator

(57) The invention relates to an arrangement for mounting the hydraulic cylinder of an elevator. The arrangement comprises the elevator guide rails (2) and a hydraulic cylinder (5) provided with a piston (6). The cylinder is mounted on the elevator guide rails (2) by means of holding devices (3) attached to the rails and supporting a cylinder supporter (7).

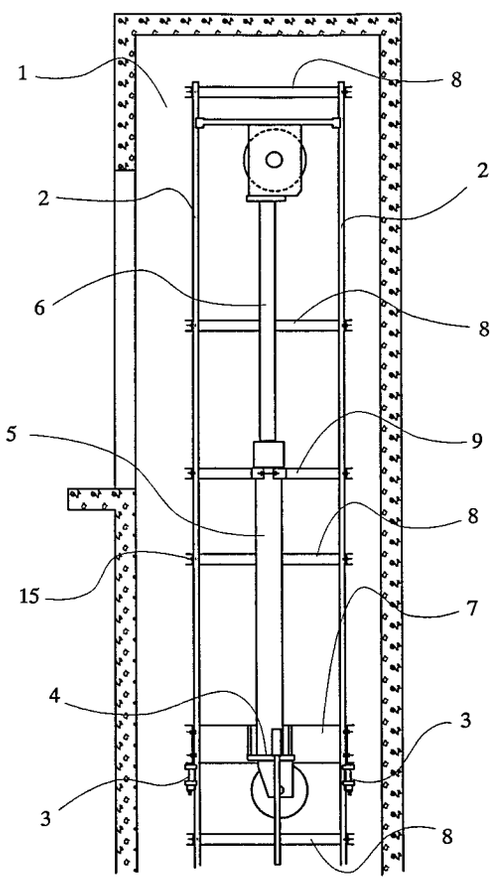

Fig. 1

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The present invention relates to an arrangement as defined in the preamble of claim 1 for mounting the hydraulic cylinder of an elevator.

In previously known solutions, the hydraulic cylinder is mounted in the elevator shaft either on the bottom of the shaft or on a pillar transmitting the forces to the bottom of the shaft. Solutions in which the cylinder is mounted on the bottom of the shaft or in a pit in the shaft bottom have the drawbacks of a low hoisting height and, in the case of a pit, a high price. Solutions using a hydraulic cylinder mounted on a pillar have the drawback of an expensive pillar construction.

The object of the present invention is to achieve a new arrangement for mounting a hydraulic cylinder which allows quick and simple installation of the hydraulic elevator and which permits advantageous use of a large hoisting height. Moreover, the drawbacks of previously known solutions are eliminated. To achieve this, the mounting arrangement of the invention is characterized by what is presented in the characterization part of claim 1.

Other embodiments of the invention are characterized by the features presented in the other claims.

The invention provides the advantage that the cylinder system achievable by using the mounting arrangement of the invention, in which the cylinder is mounted directly on the elevator guide rails and the maximum cylinder length is only about 5.5 m, makes it possible to manufacture cylinders by serial production for different lengths, e.g. with 2.5 m intervals, while at the same time enabling easy mounting of the cylinders at a desired height on the guide rails. A further advantage is that the expensive pillar or bored pit can be omitted and that a large hoisting height is made possible by mounting the cylinder at a suitable height on the guide rails.

In the following, the invention is described in detail by the aid of one of its embodiments by referring to the drawings, in which

- Fig. 1 presents the mounting arrangement of the invention in a elevator shaft, seen in side view,
- Fig. 2 presents a cylinder holding device as seen from the end of a guide rail,
- Fig. 3 presents a cylinder holding device as seen from one side of a guide rail, and
- Fig. 4 presents the frame of a cylinder holding device in an oblique top view.

Fig. 1 shows the upper end of an elevator shaft in side view. Of the elevator and shaft equipment, only the essential, most important elements with regard to the invention are shown. The elevator car 1 together with the car frame moves along vertical guide rails 2 which are fixed to the bottom of the shaft. In addition, the guide rails are secured to a shaft wall by means of rail fixing brackets 8 placed at certain distances from each other. At its lower end, the hydraulic cylinder 5 is immovably mounted directly on the elevator guide rails 2 by means of a cylinder supporter 7 provided with a projecting base 4 carrying the cylinder. This solution obviates the need for a separate supporting pillar, which, normally extending from the lower end of the hydraulic cylinder to the bottom of the shaft, would be very long and expensive. Like the rail fixing brackets 8, the cylinder supporter 7 is attached to the guide rails by means of rail clips and bolts 15. The cylinder force is transmitted by the guide rails to the bottom of the shaft.

To support the cylinder supporter vertically on the guide rails, holding devices 3 as illustrated by Fig. 2-4 are used. The frame of the holding device, which consists of a hollow wedge-shaped socket 10, 11 tapering upwards, reinforcements 13, 14 bracing the socket and a supporting bar 16 at the lower end of the socket, is placed around the back of the guide rail 2 so as to leave a free space for the elevator between the guide rails. The frame and the reinforcements 13, 14 are open on the side facing towards the guide rail, so that, as the back of the guide rail is inside the frame of the holding device, the guiding part of the rail remains outside. As seen from above, the frame has essentially the shape of a rectangular letter C in which the inclined back wall 10 is perpendicular to each of the straight side walls 11 at the edges. Starting at the front edge of each side wall there is a narrow front wall 12 in a position slightly turned out, the two front walls being essentially directed towards each other. Thus, the front walls are not exactly perpendicular to the side walls, but the slant of the front walls corresponds to the slant of the back of the guide rail. Between the front walls there remains the above-mentioned opening of the C-shaped frame, said opening extending through the whole height of the frame, through which opening the guiding part of the guide rail protrudes from inside the frame of the holding device.

The supporting bar 16 at the bottom of the holding device, which connects the two side walls 11, is provided at its middle with a threaded hole for a tightening screw 17. Moreover, on each side of the threaded hole there is one unthreaded hole for screws 18 for releasing the wedge 19. The wedge 19 placed inside the frame of the holding device is correspondingly provided with threaded holes for the release screws. The wedge 19 itself is a body of a width nearly equal to the width of the space inside the frame, tapering upwards in its lateral dimension. The wedge is mounted between the slanting back wall 10 of the frame and the rear

surface of the back of the guide rail. The straight front surface of the wedge, which is pressed against the rear surface of the back of the guide rail, is provided with two parallel cutouts, each accommodating a serrated arrester 40 designed to increase the friction. The downward directed serrations of the arrester are pressed against the rear surface of the back of the guide rail when the wedge is tightened in place by means of the tightening screw 17.

One holding device 3 is provided for each guide rail. After the holding devices have been slid onto the guide rail from the end of the rail and tightened on the guide rails and after the rails have been mounted in place, the cylinder supporter 7 can be lowered onto the holding devices. If the force applied to the cylinder supporter exceeds the hold power produced by the wedge and arrester 20, the cylinder supporter will tend to sink, thus driving the wedge deeper into the wedge socket formed by the frame of the holding device and correspondingly increasing the hold power as the pressure against the rear surface of the back of the guide rail increases.

The cylinder itself is fixed with screws onto the projecting base 4 of the cylinder supporter. When the cylinder, supporter and holding devices are to be raised e.g. during installation or repair work, the wedge is released from its tightened condition by means of the release screws 18. This solution makes it easy to mount the cylinder steplessly at the correct height in the elevator shaft and obviates the need for a separate supporting pillar as mentioned above. At its upper end the cylinder is secured by means of a band 9 or equivalent which in turn is fastened to the guide rails in the same way as the rail fixing brackets 8.

It is obvious to a person skilled in the art that different embodiments of the invention are not restricted to the example described above, but that they may instead be varied within the scope of the claims presented below. Thus, for example, the wedge need not necessarily be provided with cutouts and separate arresters 20, but the front surface of the wedge can be directly machined to form a hardenable scoring or serration to achieve the required hold power. In addition, the holding device can be so shaped on its side facing towards the guide rail that the holding devices can be reeved onto the rail from the side of the rail after installation of the guide rails.

Claims

1. Arrangement mounting the hydraulic cylinder (5) of an elevator provided with guide rails (2), **characterized** in that the hydraulic cylinder (5) is mounted on the guide rails (2) of the elevator by means of holding devices (3).

2. Arrangement as defined in claim 1, **characterized** in that the hydraulic cylinder (5) is supported by a cylinder supporter (7) resting on the holding devices (3).

3. Arrangement as defined in claim 1 or 2, **characterized** in that the holding device (3) is fastened to the back of the guide rail (2).

4. Arrangement as defined in any one of the preceding claims, **characterized** in that the holding device (3) has a hollow wedge-shaped socket (10,11,12) which is placed around the back of the guide rail, and a tightening wedge (19) placed in the socket and tapering upwards, which wedge can be tightened between the socket and rear surface of the back of the guide rail (2).

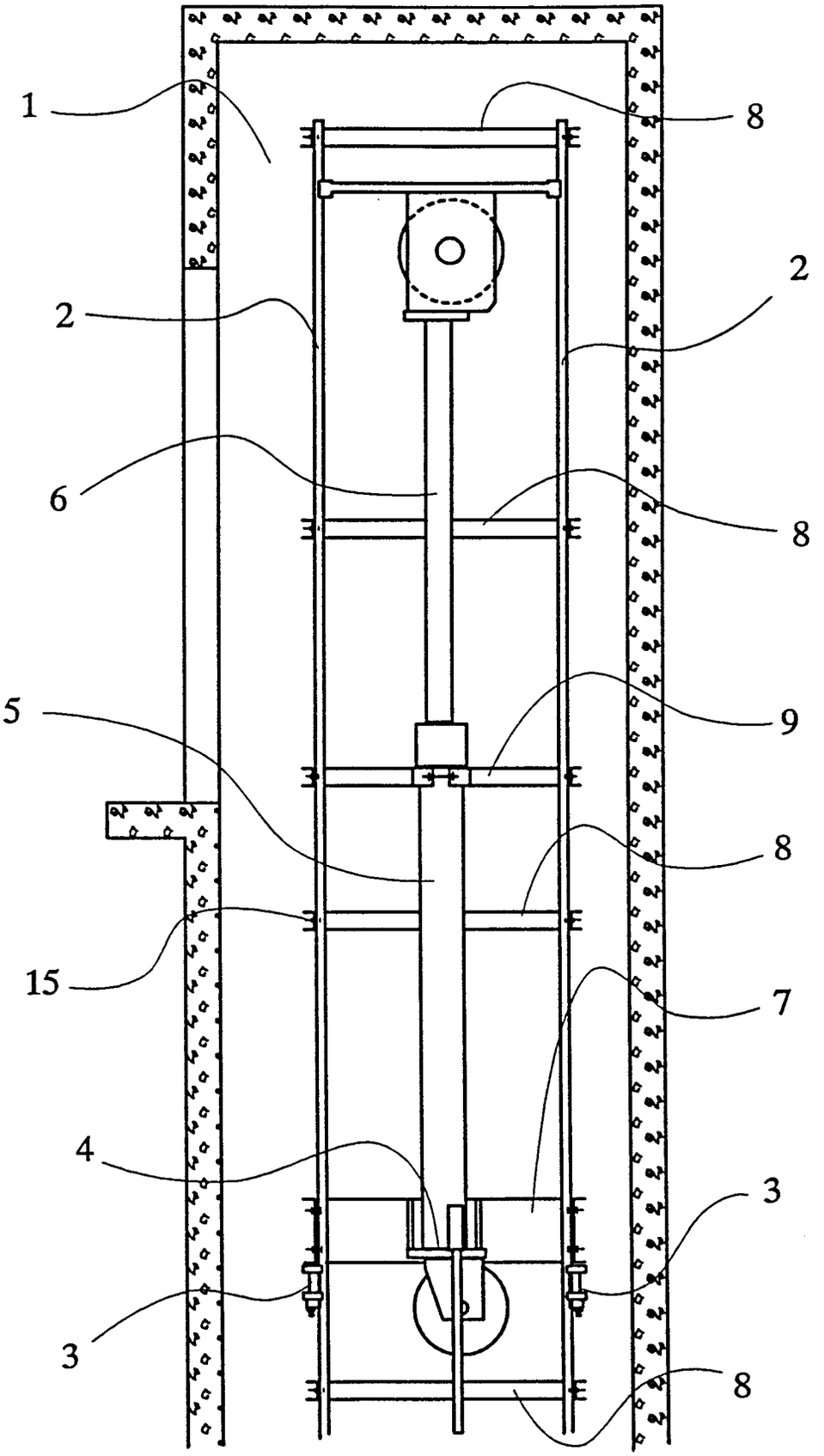

Fig. 1

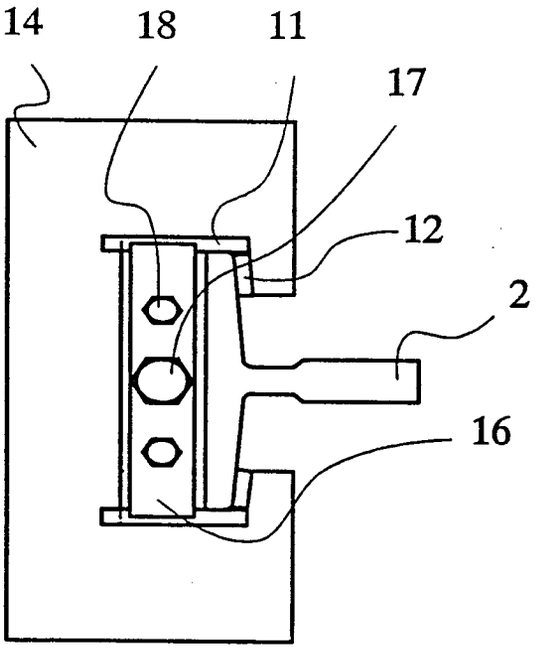

Fig.2

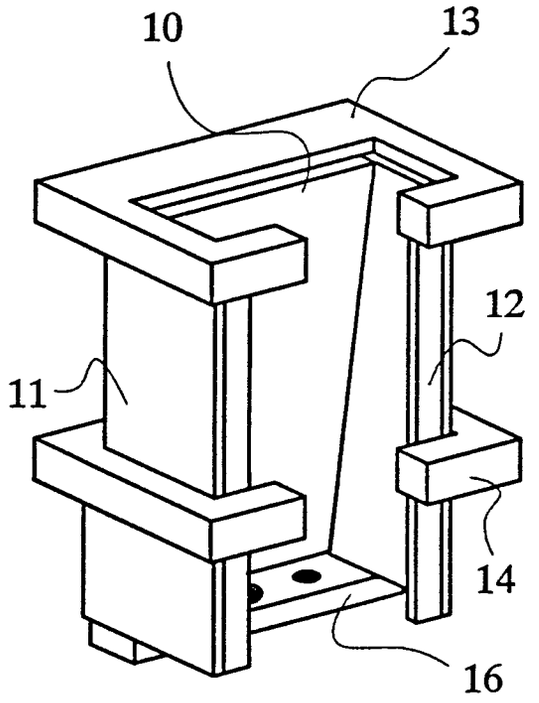

Fig. 4

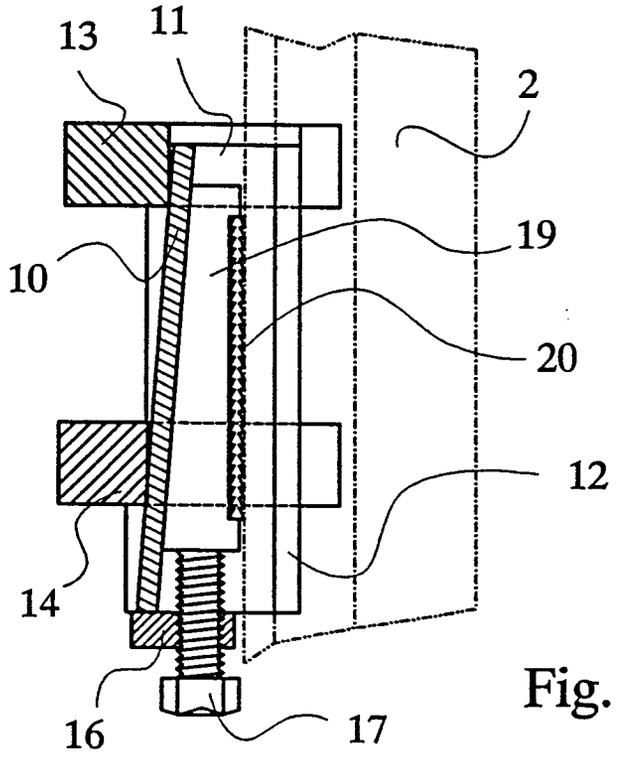

Fig. 3