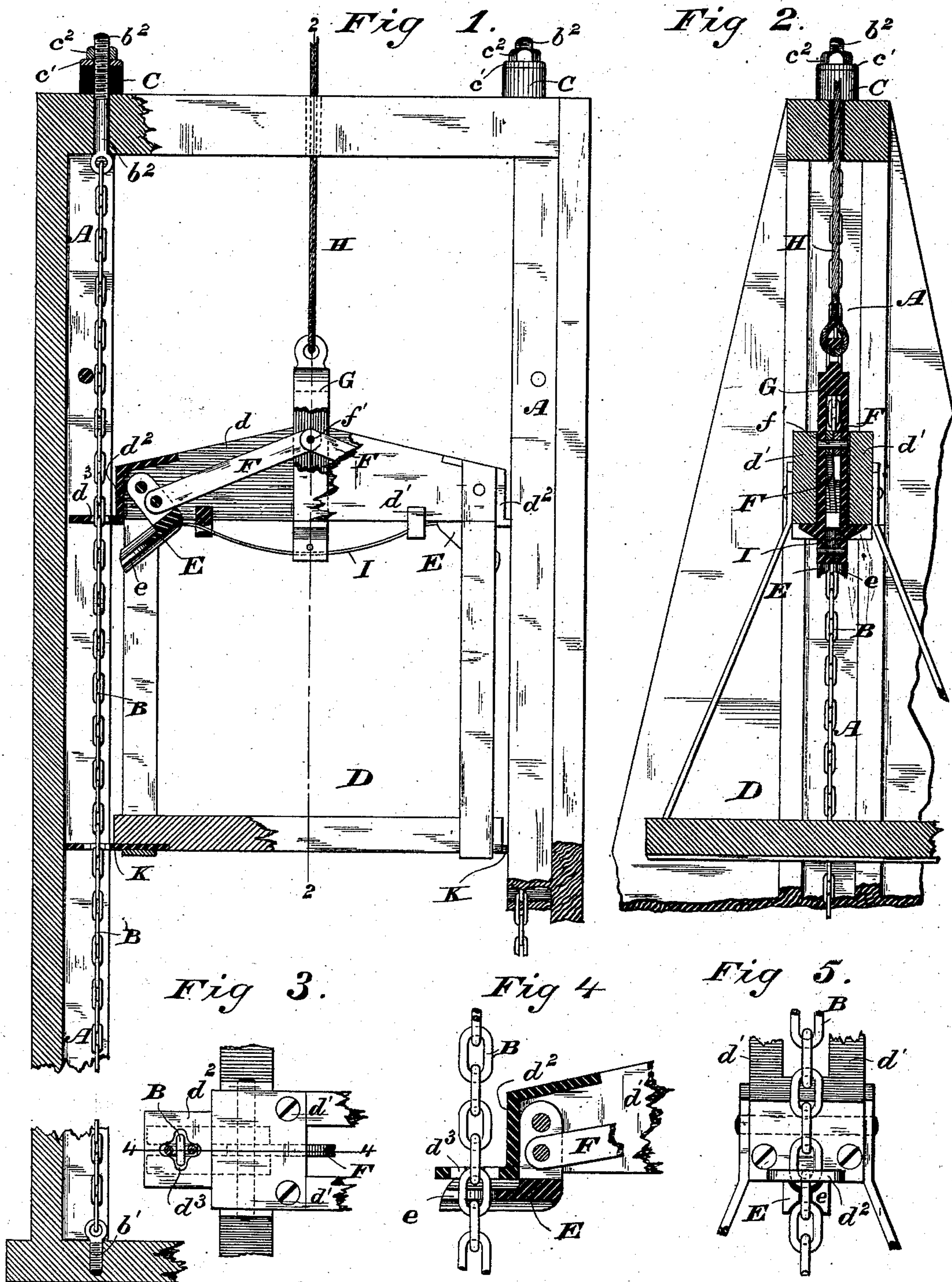


T. A. WESTON.
Elevator Safety Grappling Device.
No. 241,764. Patented May 17, 1881.



WITNESSES

Wm A Skinkley
Geo W. Brock.

INVENTOR

Thomas A Weston
By his Attorneys
Baldwin, Hopkins, & Peyton.

UNITED STATES PATENT OFFICE.

THOMAS A. WESTON, OF STAMFORD, CONNECTICUT, ASSIGNOR TO THE
YALE LOCK MANUFACTURING COMPANY, OF SAME PLACE.

ELEVATOR SAFETY GRAPPLING DEVICE.

SPECIFICATION forming part of Letters Patent No. 241,764, dated May 17, 1881.

Application filed November 23, 1878.

To all whom it may concern:

Be it known that I, THOMAS A. WESTON, of Stamford, in the county of Fairfield and State of Connecticut, have invented certain Improvements in Elevator Safety Grappling Devices, of which the following is a specification.

The object of my invention is to arrest the accidental falling of an elevator cage or platform by means of the improved devices hereinafter described.

The prominent feature of my invention consists in providing an elastic or yielding chain or chains, with which the grappling appliances of the platform or cage may engage, so as to lock it thereto and arrest its fall gradually and without shock.

In the use of the common rigid saw-toothed racks in the shaft or hoistway of an elevator a falling cage is sometimes arrested instantly by the proper engagement of its safety appliances with the teeth, producing a shock; but the teeth are often sheared or broken off by the blow, thus permitting the cage to fall to the bottom. Other forms of safety catches or clutches employing wedges, cams, and other pinching devices to engage with the rigid vertical guides of the hoistway are in varying degrees also liable to like concussions and accidents. I aim to remove this source of danger wholly by causing the falling cage to engage with the links of one or more chains suspended from the elastic yielding devices hereinafter described. By these means the descent of the cage is gently arrested through the progressive resistance of the said devices.

The accompanying drawings represent a simple form of my invention, in which the yielding device consists of an elastic buffer or spring-cushion and a chain suspended therefrom.

Figure 1 is a front elevation, partly sectional. Fig. 2 is a transverse section on the line 2 2, Fig. 1. Fig. 3 is an enlarged detail, showing in plan a part of the cage-frame and grappling device. Fig. 4 is a vertical section of the same on the line 4 4, Fig. 3. Fig. 5 is an end elevation thereof.

A A are the common vertical guide-rails for the cage attached to the walls or sides of the hoistway.

Between the rails A A are placed the sus-

pended safety-chains B B. The lower end of each chain is secured to a screw-bolt, b' , and the upper end is connected with an eyebolt or spindle, b^2 , which passes through a buffer-spring or elastic cushion, C, and also through a disk or washer, c' , and a screw-nut, c^2 , whereby the buffer is compressed and the pendent chain strained to the requisite tension.

D is the cage or platform, framed with two upper cross-beams, d' d' , and at each end of the same is secured a chain-guide, d^2 , in which is a hole, d^3 , of cruciform section, adapted to embrace the chain loosely to prevent its turning and hold it in position to be seized when necessary by the grappling devices upon the cage. These consist of two pivoted dogs or chain-pawls, E E, having their outer ends, e , bifurcated and shaped to engage with the chain-links in the manner of a tool called by workmen a "devil's claw." Two links or bars, F, are pivoted, one to each dog and jointly at their meeting ends to a common pivot, f' , in the yoke or shackle G, from which the cage is suspended by the hoisting-cable H. The yoke G embraces a spring, I, holding it in compression so long as the cage hangs suspended from the cable. This position of the grappling devices is represented in Fig. 1, the links F being pulled upward and the pawls or claws E drawn inward away from contact with the safety-chains B. Should the cable H break or get away from its proper attachment to the hoisting-drum, then the spring I, being relieved from the upward pull of the yoke G, will recoil, pulling the yoke downward and with it the connected links F, bringing them more nearly into a common straight line and forcing the pawls E outward into engagement with the indented profile of the chain. The load or weight of the cage being thus suddenly thrown upon the chains B, is through them received upon the elastic buffers C, and the cage is thus arrested without any dangerously percussive shocks.

Figs. 4 and 5 represent a pawl in the last-named position interlocked with one of the safety-chains B.

K K are chain-guides, with a cruciform opening in them, adapted, like the guides d^2 above, to hold the chain in line and prevent it from twisting.

In this described form of my invention the arrested force of a falling cage is diffused or distributed through a vertical space due to the yielding of the buffers or springs C. The arrested force, therefore, has not the dynamic effects of a blow, such as occur when the falling body or cage is abruptly intercepted in its course by rigid attachments to the building or structure containing it, and the probabilities of breakage in the said attachments and the cage are proportionately diminished.

Although the buffer represented in the drawings is a single piece of india-rubber or other elastic substance, a spring or succession of springs of increasing resistance may be employed, as in the various well-known forms of buffers and springs used upon railway-car trucks and in machinery, or a coiled spring may be employed, the chain either pulling thereon lengthwise or torsionally. In the latter case an ordinary pulley and shaft would be required, the chain having its end attached to and coiled upon the pulley for rotating it against the torsional resistance of the spring in the manner of the well-known self-coiling window-shades.

Although I have described my invention as constructed with ordinary oval-link chain, it is obvious that a wire cable or rope or any serrated bar or even a plain rod of metal could be substituted and in like manner suspended to transmit to the buffer-springs the force of the falling cage, and so arrest it without excessive shocks, but without the full advantages and certainty of action due to the linked chain, which I prefer to employ.

The points of construction and mode of operation in which my invention differs distinctly from pre-existing forms are that in the latter the rack-bar or guide or rail or corresponding fixed portion of the hoistway seized by the grappling devices upon the cage in case of accident is rigidly bolted or fixed to the walls of the hoistway or to the structure containing the cage, so that the strain thereon of the arrested cage is a downward crushing strain or blow analogous to that of a hammer upon an anvil, while in my invention the substitute for the pillar-like rack-bar or fixed rail is a suspended chain, rope, or continuous bar, free from contact with the fixed structure, except at its point of suspension, between which and

the supporting-structure the elastic or yielding portion of my device is interposed. The strain thereon of the arrested cage is a tensional one, received gradually as the buffer-spring offers resistance, in contrast with a crushing strain concentrated into a single blow in the ordinary appliances.

It is obvious that a rigid bar or rail being substituted for my preferred chain, the buffer-spring could be placed beneath it for it to push upon under the force of the arrested cage, and if this bar were guided at intervals, to keep it from buckling, the yielding effect of the buffer-spring would still accrue, but with less certainty than when the said buffer is above; for when the buffer is above the tensional strain tends to keep the bar in the line of its greatest strength, whereas when below the strain may tend to bend the bar out of that line—that is, the portion of the bar below the cage.

Although I have shown my invention as carried into effect with the safety devices doubled, one on each side of the cage, it is obvious that one only can be used, or any greater number than two—as, for instance, two on each side of the cage, making four in all—with a proportionate number of pawls, links, and springs.

I claim as my invention—

1. The combination, with an elevator-cage, of the spring-buffers C, the chains B B, and an automatic trigger or escapement grappling device, whereby the cage is positively interlocked with the said chains when falling, substantially as described.

2. The combination, with an elevator-cage, of the chains B B, the buffers C, or other yielding device, the pawls E E, the links or bars F F, the yoke G, spring I, and hoisting-rope H, substantially as described.

3. The combination, with an elevator-cage, of the spring-buffers C, the chains B B, the straining devices at the lower ends of the chains, and an automatic trigger or escapement grappling device, whereby the cage is positively interlocked with the said chains when falling, substantially as described.

In testimony whereof I have hereunto subscribed my name.

THOS. A. WESTON.

Witnesses:

M. S. HOPKINS,
WM. J. PEYTON.