

No. 844,947.

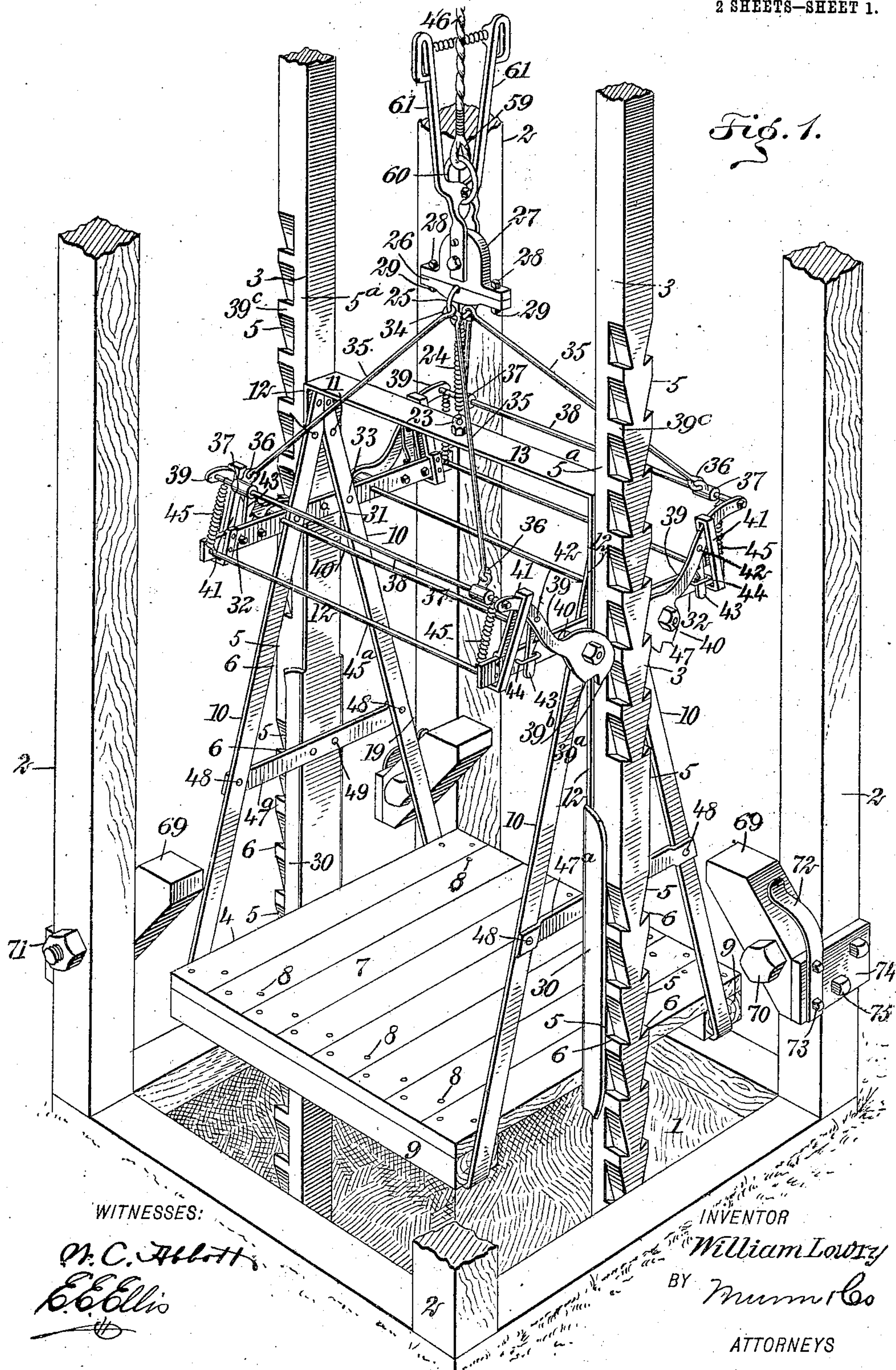
PATENTED FEB. 19, 1907.

W. LOWRY.

SAFETY DEVICE FOR ELEVATORS.

APPLICATION FILED FEB. 10, 1906.

2 SHEETS—SHEET 1.



WITNESSES:

M. C. Abbott

E. E. Ellis

INVENTOR

William Lowry

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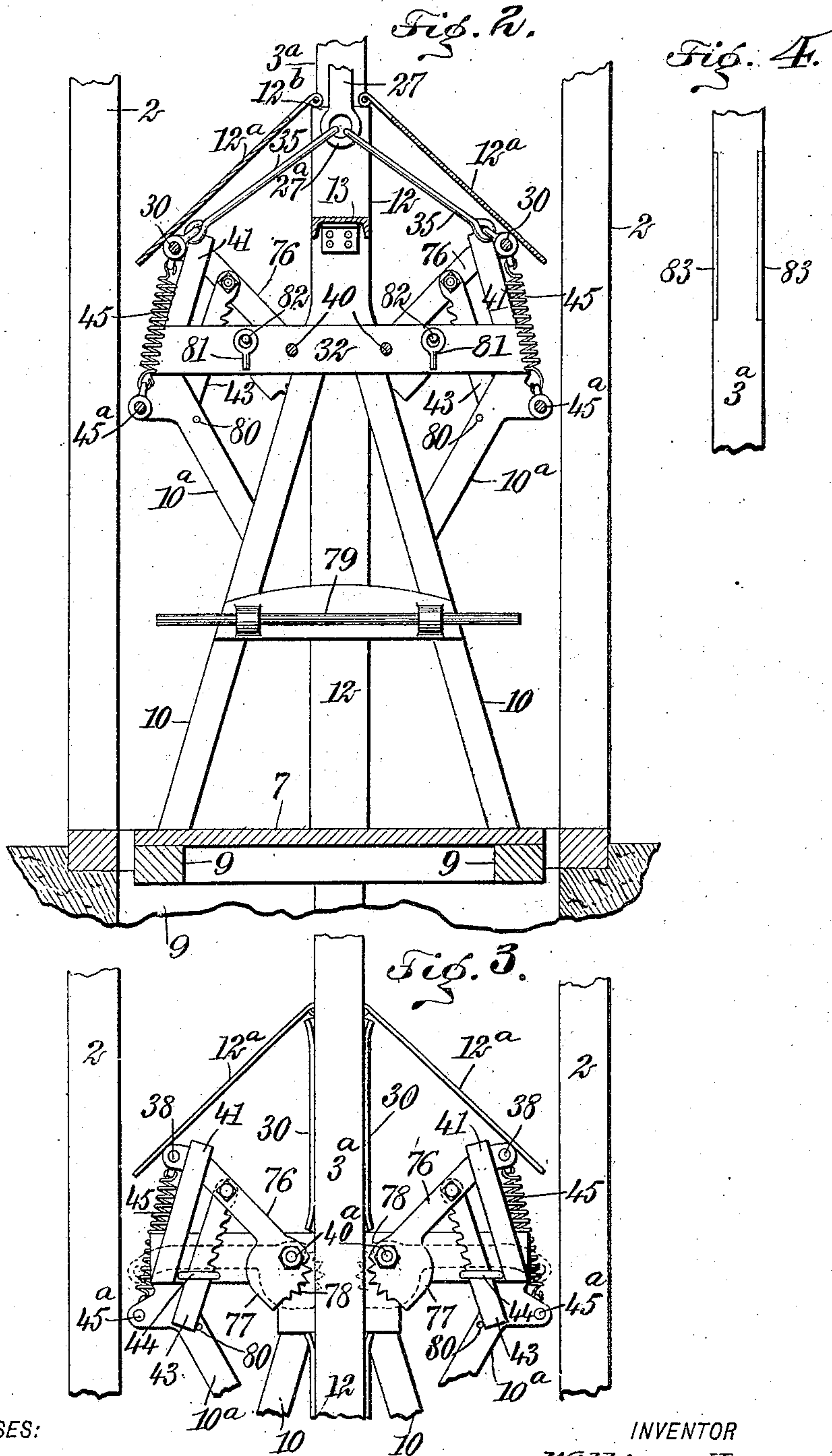
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UNITED STATES PATENT OFFICE.

WILLIAM LOWRY, OF COWLEY, ALBERTA, CANADA.

SAFETY DEVICE FOR ELEVATORS.

No. 844,947.

Specification of Letters Patent.

Patented Feb. 19, 1907.

Application filed February 10, 1906. Serial No. 300,441.

To all whom it may concern:

Be it known that I, WILLIAM LOWRY, a subject of the King of Great Britain, and a resident of Cowley, in the Province of Alberta and Dominion of Canada, have invented new and Improved Safety Devices for Elevators, of which the following is a full, clear, and exact description.

The invention has reference more especially to safety devices for elevators employed in coal and other mines, although applicable to elevators employed in other places; and one of the principal purposes of the invention is to provide devices of this kind of an embodiment to overcome numerous disadvantages and objections encountered in the use of many other devices of the kind hitherto employed.

A further purpose of the invention is to provide devices of the character referred to which are simple in construction and comparatively inexpensive to manufacture and install, besides being thoroughly effective in operation and possessing the capacity of long and repeated service.

The invention consists in the novel construction and combination of the several parts, as will be hereinafter fully set forth, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a perspective view of an elevator having the improvements embodied in connection therewith, parts being broken away. Fig. 2 is a vertical section taken through a slightly-modified form of the cage, the clutch devices whereof are especially adapted for use in connection with wooden guide members. Fig. 3 is a detail outside elevation of the clutch devices shown in Fig. 2. Fig. 4 is a side elevation of the lower end of a wooden guide member shown in Fig. 2, illustrating the application of shields to its sides to prevent the clutch devices acting when the bottom of the shaft has been reached.

Before proceeding with a more detail description it may be stated that in the form of my improvements herein shown I employ an elevator cage or lift of special construction, together with special means for preventing the falling of the same within the elevator-shaft in the event of breakage of the hoisting-cable therefor, as will be presently explained.

While I have herein represented my im-

provements in a certain preferred embodiment, it will be understood that I am not limited thereto in precise details, since immaterial changes therein may be resorted to coming within the scope of my invention.

The elevator-shaft 1 has a post or upright 2 at each corner and is provided at opposite sides with vertically-disposed metal guide members 3 for the cage or lift 4, said guide members extending from the bottom of the shaft to a suitable height above the top of the same. The guide members 3 are provided in opposite side faces with corresponding notches 5, the sides of which are reversely inclined to each other, so as to form shoulders 6 at the lower portions of the notches for a purpose to be hereinafter explained. The notches 5 are cut in the front face of the guide members, but do not extend to the back or inner face, thus providing plane or smooth surfaces 5^a in the sides of said guide members adjacent to their inner faces, as is shown in Fig. 1. The said cage or lift 4 of the elevator may be of any preferred construction. As shown, it consists of a platform 7, secured in any suitable way, as by means of bolts or rivets 8, to transverse beams 9, being secured to the end thereof opposite sets of hangers 10, those of each set being inclined toward each other at the upper ends thereof and secured by means of bolts or rivets 11 to oppositely-disposed vertical plates 12, the upper ends of which are connected by an integral cross-plate 13, provided at its center with an upwardly-extending eye 23, in which eye is received the lower end of a strong spiral spring 24, the upper end whereof is suitably fastened to a ring or loop 25, suspended from the lower member 26 of the suspensory 27 for the cage or lift, said member being held in place by means of suitable bolts 28 and nuts 29, as is shown in Fig. 1. The lower ends of the said vertically-disposed plates 12 are secured in any suitable way to the sides of the platform 7 at which they are located and are provided for a suitable portion of their length with wings 30 at their longitudinal edges, embracing the guide members 3, as shown, it being further mentioned that the said vertically-disposed plates 12 have horizontal plates 32 secured thereto near their upper ends by means of pins or bolts 31, which horizontal plates 32 are also preferably secured to the upper portions of the hereinbefore-mentioned hangers 10 by means of pins or bolts 33 or in any

other suitable way. Pairs of divergent rods 35 are loosely connected to said ring or loop 25, as shown at 34 in Fig. 1, and the lower ends of each pair of rods are loosely connected at 36 to couplings 37, rigidly carried at or near the ends of the transverse rods 38, the ends of which rod are rigidly connected with oppositely-disposed lever-pawls 39, that are fulcrumed or movably mounted upon a fixed rod 40, extending from one parallel horizontal plate 32 to the other, as is shown in Fig. 1, which plates 32 carry upwardly and inwardly inclined guides 41 for said lever-pawls 39, each of the latter being pivoted thereto at 42, a toothed gravity-pawl 43 having swinging movement in a guide 44 on the adjacent horizontal plate 32.

It may here be stated that the head portions of the pawl-levers 40 which are opposite the notches 5 in the guide members 3, as is shown in Fig. 1, are provided at their lower edges with a downwardly-extending tooth 39^a and an adjacent shoulder 39^b, the shoulder being at the outer edge of the tooth. The transverse rods 38 are connected at their ends with fixed rods 45^a, extending from one horizontal plate 32 to the other, by means of coil-springs 45 of suitable strength, it being here mentioned that the weight of the cage or lift 4, especially when loaded, maintains the said springs 45, as well as the spring 24, distended and also tends to depress the divergent rods 35, and thus draw them together at their lower ends, thereby pulling the transverse rods 38 upward and rocking the lever-pawls 39 on their fulcrums, thus holding the said pawls out from the toothed surfaces of the guide members C or in positions which will enable the cage or lift to be raised and lowered within the shaft without obstruction. Should the hoisting rope or cable 46 for the lift or cage break, however, the reactionary effect of the said springs 45 will rock the lever-pawls on their fulcrums to thus carry one or the other of the teeth 39^a of said pawls into engagement with the opposite ones of the shoulders 6 of the said guide members 3, as will be apparent by reference to Fig. 1. As soon as the said lever-pawls 39 are thus actuated certain teeth of the toothed gravity-pawls 43 will be caused to engage with the inner portions of guides 44 therefor, due to the fact that as the lever-pawls are caused to be lowered in the manner just referred to the said gravity-pawls will be caused to swing inwardly in an obvious manner. When the several springs referred to are under tension or distended, the upward movement of the lever-pawls 39 is limited by the said guides 41, and the heads of the lever-pawls when the outer ends of said pawls are elevated in said guides, as has been stated, will be removed from engagement with the shoulders 6 of the notches 5 on the guide members 3.

If desired, the hangers 10 of each set thereof may be suitably braced together by means of plates 47^a, secured thereto at 48 and to the vertically-disposed plates 12 at 49 in any suitable way.

It may here be remarked that when a lever-pawl 39 is brought to a clutch relation with the notched surface of a guide member 3 the tooth 39^a will rest flat upon the shoulder 6, as stated, and that the shoulder 39^b on the head of the said lever-pawl will engage with the flat surface at the top of the next notch and adjacent to the shoulder engaged by the tooth, thus giving the head of the lever-pawl a firm grip on the guide member with which it engages, and the said plain surfaces just referred to are plainly shown at 39^c in Fig. 1.

As shown in Fig. 1, the lower end of the hoisting rope or cable 46 is provided with a loop 59, in which is held a ring 60. The lower end of the rope may be detachably connected with the suspensory 27 by any suitable means, the means shown consisting of the spring-controlled arms 61, which are pivoted together and held to turn in the ring 60, the arms being provided with jaws carrying pins for engaging openings in the suspensory.

In order to prevent the cage or lift from dropping downward in the elevator-shaft should the suspensory 27 become detached or disconnected from the hoisting rope or cable 46, blocks 69 may be employed, pivotally supported on the posts or uprights 2 at the upper part of the elevator-shaft by means of pins or bolts 70, extending through the post or upright and secured in place by a nut 71, said blocks being normally forced inwardly within the path of the cage or lift by means of curved springs 72, fastened at 73 to the plate 74, also secured to the posts or uprights 2 by means of bolts 75 or in any other suitable way. Said bolts serve as stops for the blocks, inasmuch as the lower ends of the blocks normally abut thereagainst; but in the event of the cage or lift rising too far in the shaft the blocks will be engaged thereby at the corners and turned on their pivots against the pressure of the springs 72, thereby permitting the cage or lift to pass the same, whereupon the springs can carry them inward of the shaft, as before. Now should the suspensory become detached the said blocks 69 will serve to catch the cage or lift in its descent. I desire it to be understood, however, that the blocks 69 are not absolutely necessary, as the clutch mechanism described will effectually stop the descent of the cage when necessary.

The hereinbefore-mentioned spring 24 is not absolutely essential to the operation of my improvement; but the use of the same is preferred in that in the event of the hoisting rope or cable breaking at a point thereof near the engine or winding-drum (not shown) the said spring will act to sustain all the weight of the pull of the hoisting rope or

cable, thereby enabling the springs 45 to more effectually carry out their special function, which is to actuate the lever-pawls 39 in the manner and for the purpose hereinbefore set forth.

In Fig. 2 I have illustrated a slight departure in the construction of the lever-pawls whereby they are adapted for use in connection with wooden guide members, (designated as 3^a, the said lever-pawls being designated as 76,) and they are mounted and operated in the same manner as has been described with reference to the lever-pawls 39; but the heads 77 of the lever-pawls 76 are provided with series of teeth 78, which when the lever-pawls are in operation embed themselves in the wooden guide members, as is shown by dotted lines in Fig. 3. The general construction of the lift or cage differs from that shown in Fig. 1 in few details only. The vertical plates 12 are longer and extend beyond the cross-plate 13 and are connected at their upper ends by a second cross-plate 12^b to form bearings for hinged cover-plates 12^a, whose lower portions rest upon the transverse rods 38, and bracket-arms 10^a extend up from the outside edges of the hangers 10 to an engagement with the ends of the horizontal plates 32, and said hangers 10 and vertical plates 12 are made to support handhold bars 79, and the horizontal rods 45^a, (shown in Fig. 2,) which correspond to the rods 45, (shown in Fig. 1,) are secured to the bracket-arms 10^a instead of to the horizontal plates 32. In the event the lever-pawls 76 should act to grip the guide members 3^a and it is desired to raise the cage the lever-pawls can be held out of possible engagement with the said guide members 3^a by passing pins 81 through openings 80 in the bracket-arms 10^a to an engagement with the inner edges of the lower ends of the gravity-pawls 43 to hold the teeth of such gravity-pawls from engagement with their guides 44. These pins 81 when not in use are usually hung upon projections 82 from the horizontal plates 32. In order that the lever-pawls 76 shall not act upon the guide members 3^a to grip the same when the cage is at the bottom of the shaft and the hoist-rope is slackened, the said guide members at their lower ends are provided on opposite sides with metal counter-sunk shields 83, as is shown in Fig. 4, and at such time the heads of the lever-pawls if carried toward the guide members 3^a will engage with the shields and will not have clutching action on the said guide members.

The suspensory 27 is provided with an eye 27^a at its lower central portion, which receives the upper ends of the divergent rods 35.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In an elevator, the combination with vertical guide members in the elevator-

shaft, having shoulders on opposite side faces, of a cage having opposite sets of hangers, a hoisting-cable and suspensory for the cage connected therewith, divergent rods loosely held by the suspensory, devices on the hangers for engagement with said shoulders, and means between said hangers and rods, adapted to bring said devices into action upon breakage of the hoisting-cable.

2. In an elevator, the combination with vertical guide members in the elevator-shaft having shoulders on opposite faces thereof, of a cage having opposite sets of hangers, a hoisting-cable and a suspensory therefrom for the cage, divergent rods held by the suspensory, devices on the hangers for engagement with said shoulders, and spring-controlled means between said hangers and rods for drawing the said devices into engagement with the said shoulders of the breakage of the hoisting-cable.

3. In an elevator, the combination with vertical guide members in the elevator-shaft, having shoulders on opposite faces thereof, of a cage having opposite sets of hangers, a hoisting-cable and a suspensory therefrom for the cage, divergent rods loosely held by the suspensory, devices on the hangers for engagement with said shoulders, and means between said hangers and rods, adapted to draw said devices into action on breakage of said hoisting-cable, said means embodying transverse rods connecting the ends of pairs of said divergent rods.

4. In an elevator, the combination with vertical guide members in the elevator-shaft, having shoulders on opposite faces thereof, of a cage having opposite sets of hangers, a hoisting-cable and a suspensory therefrom for the cage, divergent rods held by the suspensory, devices on the hangers for engagement with said shoulders, and spring-controlled means between said hangers and rods for drawing said devices into such engagement on the breakage of the said hoisting-cable, embodying transverse rods connecting the ends of pairs of said divergent rods.

5. In an elevator, the combination with vertical guide members and an elevator-shaft having shoulders on opposite faces thereof, of a cage having opposite sets of hangers, a hoisting-cable and a suspensory therefrom for the cage, divergent rods loosely held by the suspensory and connected with the cage, lever-pawls pivotally mounted on the hangers, adapted for engagement with said shoulders, and means between said hangers and rods for bringing the pawls into action upon the breakage of the hoisting-cable.

6. In an elevator, the combination with vertical guide members in the elevator-shaft, having shoulders on opposite faces thereof, of a cage having opposite sets of hangers, a hoisting-cable and a suspensory therefrom

for the cage, divergent rods loosely held by the suspensory and connected with the cage, lever-pawls mounted on the hangers, adapted for engagement with said shoulders, 5 toothed gravity-pawls pivotally suspended from said lever-pawls, guides for the gravity-pawls located on said hangers, which guides are arranged for locking engagement with the teeth of the pawls, and means between 10 the said hangers and rods for throwing the lever-pawls into action.

7. In an elevator, the combination with vertical guide members in the elevator-shaft having shoulders on opposite faces thereof, 15 of a cage having opposite sets of hangers, a hoisting-cable and a suspensory therefrom for the cage, divergent rods loosely held by the suspensory, lever-pawls mounted on the hangers and adapted for engagement with 20 said shoulders, toothed gravity-pawls suspended from said lever-pawls, guides for the gravity-pawls arranged for locking engagement with their teeth, and spring-controlled means between said hangers and rods for 25 bringing the lever-pawls into operation.

8. In an elevator, the combination with vertical guide members for the elevator-shaft, having shoulders on opposite faces thereof, of a cage having opposite sets of 30 hangers, a hoisting-cable and a suspensory therefrom for the cage, divergent rods loosely held by the suspensory, lever-pawls mounted on the hangers, adapted for engagement with said shoulders, toothed gravity-pawls pivotally suspended from said lever-pawls, locking-guides for the gravity-pawls, 35 and means between the said hangers and rods for bringing the lever-pawls into action at the breakage of the hoisting-cable.

40 9. In an elevator, the combination with vertical guide members in the elevator-shaft

having shoulders on opposite faces thereof, of a cage having opposite sets of hangers, a hoisting-cable and a suspensory therefrom 45 for the cage, divergent rods loosely held by the suspensory, being connected with the cage, lever-pawls mounted on the hangers, adapted for engagement with said shoulders, toothed gravity-pawls pivotally suspended 50 from said lever-pawls, locking-guides for the gravity-pawls carried by the hangers, and spring-controlled means between said hangers and rods for bringing the lever-pawls into action.

10. In an elevator, the combination with 55 vertical guide members in the elevator-shaft having shoulders on opposite faces thereof, of a cage having opposite sets of hangers provided with horizontal plates, vertical plates 60 disposed at the sides of the cage, a cross-plate connecting the vertical plates at their upper portions, said vertical plates being also secured to the hangers and provided with wings to embrace the said guide members, a hoisting-cable and a suspensory therefrom for 65 the cage, divergent rods held by the said suspensory at their upper ends, parallel rods connecting pairs of said divergent rods at their lower ends, which parallel rods are secured to the cage, springs connected with the 70 said parallel rods, and means controlled by the said springs, to automatically engage said shoulders upon breakage of the hoisting-cable.

In testimony whereof I have signed my 7 name to this specification in the presence of two subscribing witnesses.

WILLIAM LOWRY.

Witnesses:

WILLIAM JOHN BARRY,
THOMAS LOWRY.