

No. 748,962.

PATENTED JAN. 5, 1904.

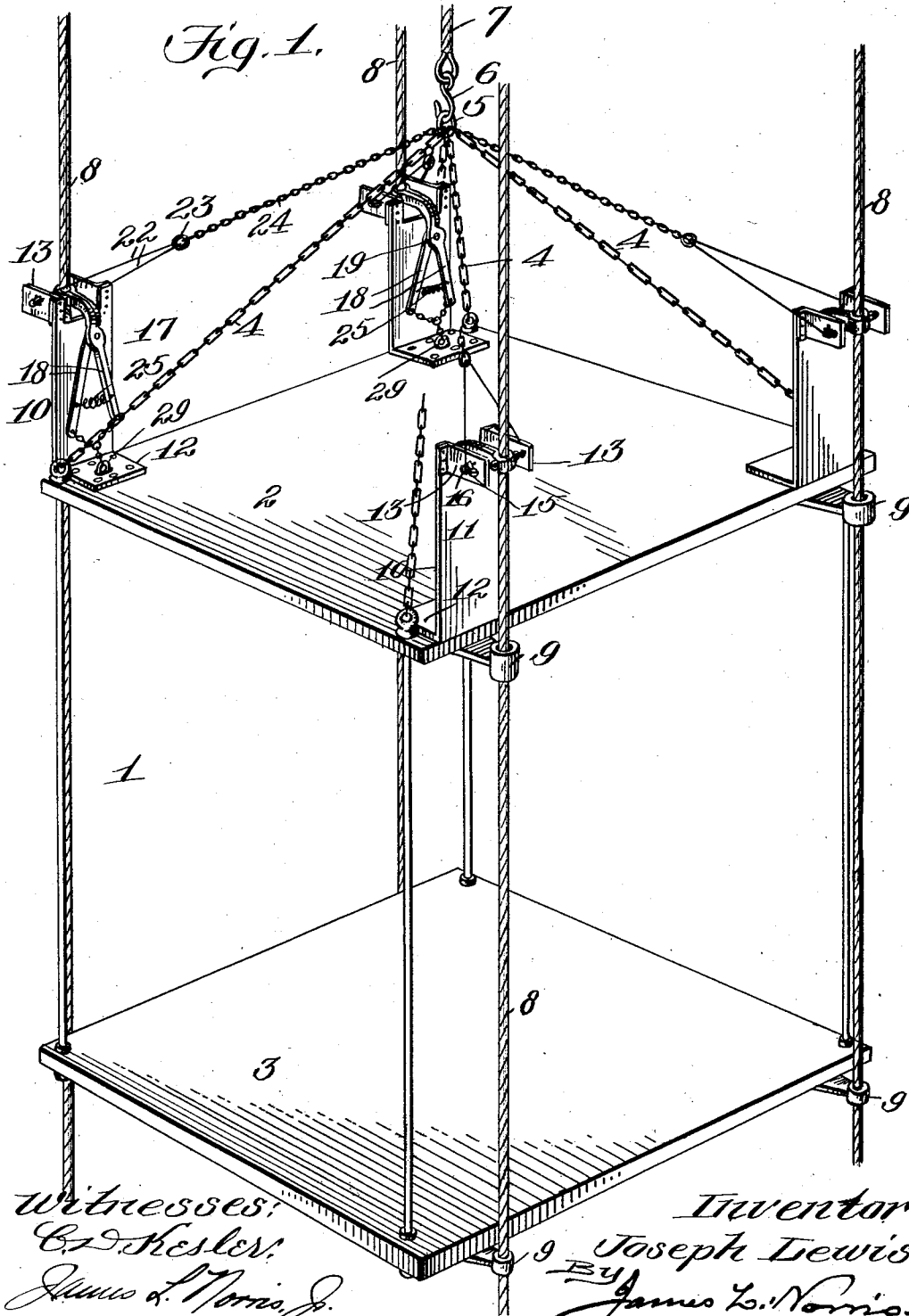
J. LEWIS.

SAFETY APPLIANCE FOR MINING HOISTS.

APPLICATION FILED OCT. 19, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses:
C. S. Hester,
James L. Norris, Jr.

Inventor
Joseph Lewis
By James L. Norris,
Att'y.

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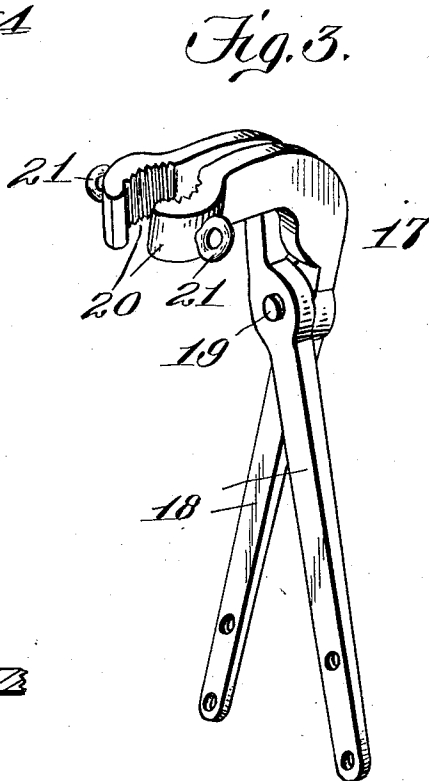
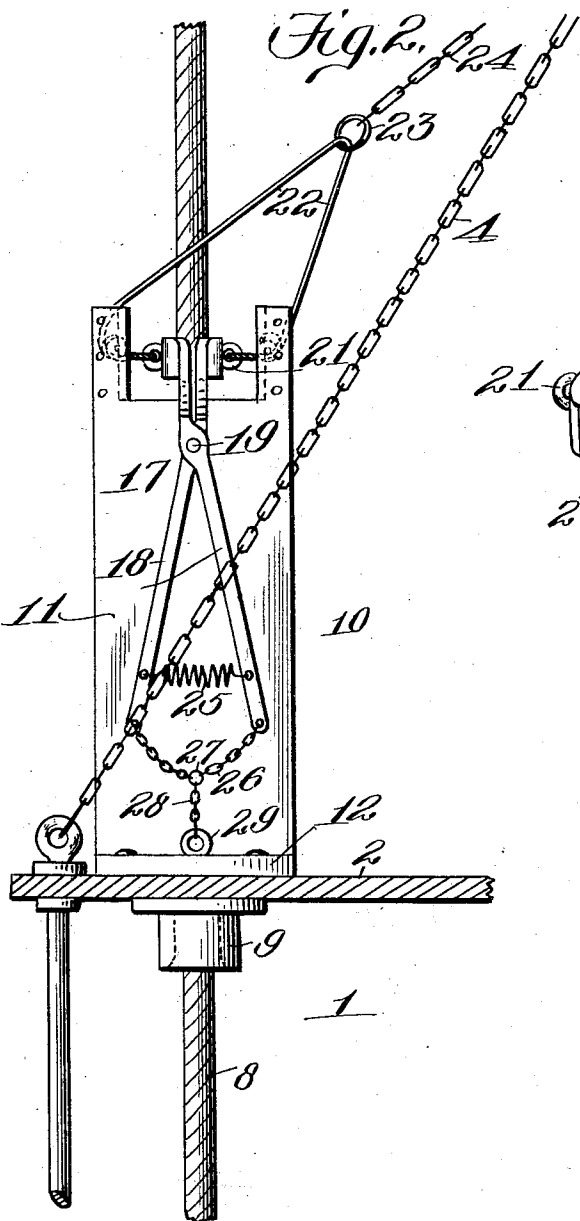
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SAFETY APPLIANCE FOR MINING HOISTS.

APPLICATION FILED OCT. 19, 1903.

NO MODEL.

2 SHEETS—SHEET 2.



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James L. Norris, Jr.

Inventor
Joseph Lewis
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UNITED STATES PATENT OFFICE.

JOSEPH LEWIS, OF SAULT STE. MARIE, CANADA.

SAFETY APPLIANCE FOR MINING-HOISTS.

SPECIFICATION forming part of Letters Patent No. 748,962, dated January 5, 1904.

Application filed October 19, 1903. Serial No. 177,674. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH LEWIS, a subject of the King of Great Britain, residing at Sault Ste. Marie, in the Province of Ontario and Dominion of Canada, have invented new and useful Improvements in Safety Appliances for Mining-Hoists, of which the following is a specification.

This invention relates to safety appliances for mining-hoists, and especially to that class of such appliances which operate to automatically prevent the car cage or platform from falling in the event of the hoisting-cable breaking; and it has for its object to provide improved mechanism of the class described which will be simple and inexpensive in construction and prompt and reliable in operation.

To these ends my invention consists in the features and in the construction, combination, and arrangement of parts hereinafter described, and particularly pointed out in the claims following the description, reference being had to the accompanying drawings, forming a part of this specification, wherein—

Figure 1 is a perspective view illustrating my improved safety device applied to a mining hoist-car. Fig. 2 is an enlarged detail view illustrating one of the grips fixed in operative position, and Fig. 3 is a detail perspective view of one of the grips detached.

Referring to the drawings, the numeral 1 indicates a cage which is adapted to be hoisted and lowered in the shaft of a mine, for example. 2 indicates the top thereof, and 3 the bottom, said top and bottom being rigidly connected together in any suitable manner. Attached to the four corners of the top 2 of the cage are supporting chains or cables 4, which converge at their upper ends centrally over the top of the cage and are united by a ring 5, which is engaged by a coupling 6, that is attached to the lower end of the hoisting-cable 7.

Arranged in the mine-shaft are four cables 8, preferably comprised of wire rope, said cables extending vertically in the shaft and secured in any suitable means to the top and bottom thereof, the guide-cables 8 being arranged in such manner that they will be disposed adjacent to the four corners of the cage 1.

Fixed to the top and bottom of the cage 1 and at the corners thereof are perforated brackets 9, which embrace the guide-cables 8 and are free to travel up and down the same. Attached to the four corners of the top 2 of the cage are vertical standards 10, each comprising a metallic plate 11, provided at its lower end with a flange 12, which is bolted to the top 2 of the cage, and at its upper end is provided with outwardly and laterally projecting right-angled flanges 13, having parallel upright sides, said flanges being arranged on opposite sides of the adjacent guide-cable 8. The flanges 14 are each provided with perforations 15, and the outermost of said flanges is preferably provided with a small guide-pulley 16, arranged above and in close proximity to the adjacent perforation 15.

The numeral 17 indicates a grip comprising two levers 18, which are pivoted together intermediate their ends, as at 19, said levers crossing one another at one end and provided at the extremities of such crossed ends with semicircular gripping-jaws 20, which are preferably serrated on their inner faces for the purpose hereinafter made apparent. The two jaws 20 encircle the adjacent guide-cable 8, and to said jaws are attached eyes or suitable fastenings 21. To the eyes 21 are attached the ends of a rope 22, passing through the perforations 15 and over the guide-pulleys 16 and through a ring 23, and to said ring is attached one end of a rope, chain, or cable 24, the other end of which is attached to the ring 5, which is suspended from the hoisting-cable 7 and connected to the supporting-cables 4. As shown, the grip 17 is formed after the manner of a pair of tongs, and between the lower ends of the levers 18, constituting said tongs, is a contractile spring 25, the ends of which are attached to said levers, said spring having a tendency to draw together the jaws 20. To the lower extremities of the levers 18 are attached ropes or other flexible connections 26, which are also attached to a ring 27, and to said ring is attached one end of a rope 28, the other end of which is attached to an eyebolt or other suitable fastening 29, firmly secured to the top 2 of the cage.

It will of course be understood that there will be provided in practice one grip 17 for each of the four guide-cables 8; but inasmuch

as these grips are duplicates one of the other a description of the construction and operation of one of them will answer for all.

The operation of my improved safety device is as follows: In practice the ropes 22 and 24 will be so proportioned that as the cage is hoisted and lowered or held suspended within the shaft—in other words, as long as the supporting-ropes 4 are held taut by the weight of the cage—the ropes 24 will also be taut and through the medium of the ropes 22 will hold the jaws 20 of the grips separated or slightly spread apart, so that as the cage is raised and lowered in the shaft said jaws will slide loosely over the guide-cables 8 and will not obstruct or interfere in any manner with the raising and lowering of the cage. Should, however, the hoisting-cable part or break, the supporting-cables 4 will immediately be slackened, thus relieving the ropes 24 of all strain or tension, whereupon the spring 25 will immediately act to throw the jaws 20 into engagement with the guide-cables 8. As the car attempts to drop by gravity, it being no longer supported by the hoisting-cable 7, the lower ends of the levers 18 will be drawn together by the chains 26 and 28 by the weight of the cage, and the jaws will be caused to firmly grip the guide-cables and arrest the descent of the cage and prevent it from falling.

It will of course be understood that if the springs 25 or some equivalent devices were not provided, inasmuch as the grip-tongs are movable with the cage, the jaws might not be drawn into engagement with the guide-cables when the car starts to fall, and the purpose, therefore, of said springs is to immediately throw the jaws 20 into frictional engagement with the guide-cables with sufficient force to prevent said jaws from readily sliding down on the guide-cables and to hold them in this position until the weight of the car shall have exerted its strain on the rods 26 and 28, and thus cause the jaws to positively grip the guide-cables. It will be obvious that the greater the weight of the car the more firmly will the cables be gripped, and as said jaws are serrated upon their inner faces in the manner above described they will grip the cables so forcibly as to render the falling of the cage impossible.

I have shown and described an ordinary form of cage, such as is commonly employed for the purpose, and I have also described the invention as applied to mine hoisting; but it will be manifest that the cage may be of any suitable construction and that the invention may be applied to hoists of all kinds. It will also be obvious that the cables and other flexible connections may consist of ropes, wire cables, chains, or any flexible connections suitable for the purpose.

It will be evident to those skilled in the art that various changes or alterations in the details of construction and arrangement of parts of my improved device may be made without departing from the spirit of my invention,

the construction and arrangement herein shown being the preferred one; but I do not confine myself to such, except as hereinafter specified in the claims hereunto annexed.

Having described my invention, what I claim is—

1. In a safety device for hoisting apparatus, the combination with a cage, of vertical guides between which the cage travels, a cable for raising and lowering the cage, tongs arranged to grip the guides and hold the cage stationary, flexible connections between the tongs and the hoisting-cable arranged to hold the tongs inoperative while the hoisting-cable is taut, and means connected to the cage and constructed to automatically cause the tongs to clamp the guides and prevent the descent of the cage when the cable becomes slack, substantially as described.

2. In a safety device for hoisting apparatus, the combination with a cage, of vertical guides between which the cage travels, a cable for raising and lowering the cage, grip-tongs for gripping the guides to hold the cage stationary, flexible connections between the gripping-jaws of the tongs and hoisting-cable to hold said jaws out of engagement with the guides when the cable is taut, and means carried by the cage arranged to cause the said gripping-jaws to clamp the guides and prevent the descent of the cage when the cable becomes slack, substantially as described.

3. In a safety device for hoisting apparatus, the combination with a cage, of vertical guides between which the cage travels, a cable for raising and lowering the cage, grip-tongs for gripping the guides to hold the cage stationary, flexible connections between the gripping-jaws of the tongs and hoisting-cable to hold said jaws out of engagement with the guides when the cable is taut, and connections between the other ends of the tongs and the cage arranged to close the jaws on the guides and prevent the descent of the cage when the cable becomes slack, substantially as described.

4. In a safety device for hoisting apparatus, the combination with a cage of vertical guides between which the cage travels, a cable for raising and lowering the cage, grip-tongs for gripping the guides to hold the cage stationary, flexible connections between the gripping-jaws of the tongs and the cable to hold said jaws out of engagement with the guides when the cable is taut, connections between the other ends of the tongs and the cage arranged to close the jaws on the guides and prevent the descent of the cage when the cable becomes slack, and springs arranged to impart an initial grasping action of the jaws before the latter are clamped on the guides by the weight of the cage, substantially as described.

5. In a safety device for hoisting apparatus, the combination with a cage, of vertical guides between which the cage travels, a cable for raising and lowering the cage, gripping-tongs

connected at one end to the cage and provided at the other end with jaws arranged to grip the guides and prevent the descent of the cage when the cable becomes slack, contractile springs arranged between and connected to the lever ends of the tongs for imparting an initial clamping action of the jaws upon the guides, and flexible connections attached at one end to the jaws and at the other end to the cable and arranged to hold the jaws separated when the cable is taut, substantially as described.

6. In a safety device for hoisting apparatus, the combination with a cage, of vertical guides between which the cage travels, a cable for raising and lowering the cage, gripping-tongs provided at one end with jaws arranged to embrace said guides, flexible connections between said cable and the jaws for holding said jaws out of frictional engagement with the guides when the cable is taut, contractile springs attached to the other end of the tongs for drawing said jaws together on the guides, and flexible connections attached to the lever ends of the tongs and to the cage and arranged to forcibly clamp the jaws on the guides when the cable becomes slack, substantially as described.

7. In a safety device for hoisting apparatus, the combination with a cage, of vertical guides between which the cage travels, a cable for raising and lowering the cage, perforated brackets fixed to the cage and loosely embracing the guides, gripping-tongs provided at one end with jaws arranged to embrace said guides, flexible connections between said cable and the jaws arranged to hold the jaws separated when the cable is taut, contractile springs arranged between and attached to the other ends of the tongs and arranged to cause the jaws to grip the guides with a yielding force immediately upon the release of the jaws, and flexible connections attached to the last-named ends of the tongs and to the cage and arranged to forcibly clamp the jaws on the guides when the cable becomes slack, substantially as described.

8. In a safety device for hoisting apparatus, the combination with a cage, of vertical guides between which the cage travels, a cable for raising and lowering the cage, vertical standards fixed to the top of the cage and provided

at their upper ends with outwardly-projecting perforated flanges, gripping-tongs provided at one end with jaws arranged to embrace the guides between said flanges, flexible connections passing through the perforated flanges and attached to the jaws, means connecting said flexible connections to the cable whereby the jaws are held separated when the cable is taut, and flexible connections attached to the other ends of the tongs and to the cage whereby the jaws are caused to grip the guides when the cable becomes slack, substantially as described.

9. In a safety device for hoisting apparatus, of vertical guides between which the cage travels, a cable for raising and lowering the cage, vertical standards fixed to the top of the cage and each provided at its upper end with two outwardly-projecting perforated flanges which straddle the adjacent guide, gripping-tongs provided at one end with jaws disposed between said flanges and embracing said guides, flexible connections passing through the perforated flanges and attached to the jaws, means connecting the flexible connections to the cable whereby the jaws are held separated when the cable is taut, and flexible connections attached to the other ends of the tongs and to the cage whereby the jaws are caused to grip the guides when the cable becomes slack, substantially as described.

10. In a safety device for hoisting apparatus, the combination with a cage, of vertical guide-cables between which the cage travels, brackets on the cage through which said cable-guides loosely pass, a cable for raising and lowering the cage, tongs for gripping the cable-guides, flexible connections between the tongs and the hoisting-cable constructed to hold the grips inoperative when the hoisting-cable is taut, and springs arranged to close the tongs and cause the latter to grip the guide-cables and prevent the descent of the cage when the cable becomes slack, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JOSEPH LEWIS.

Witnesses:

JOHN SHEEHAN,
JOHN DAVIES.