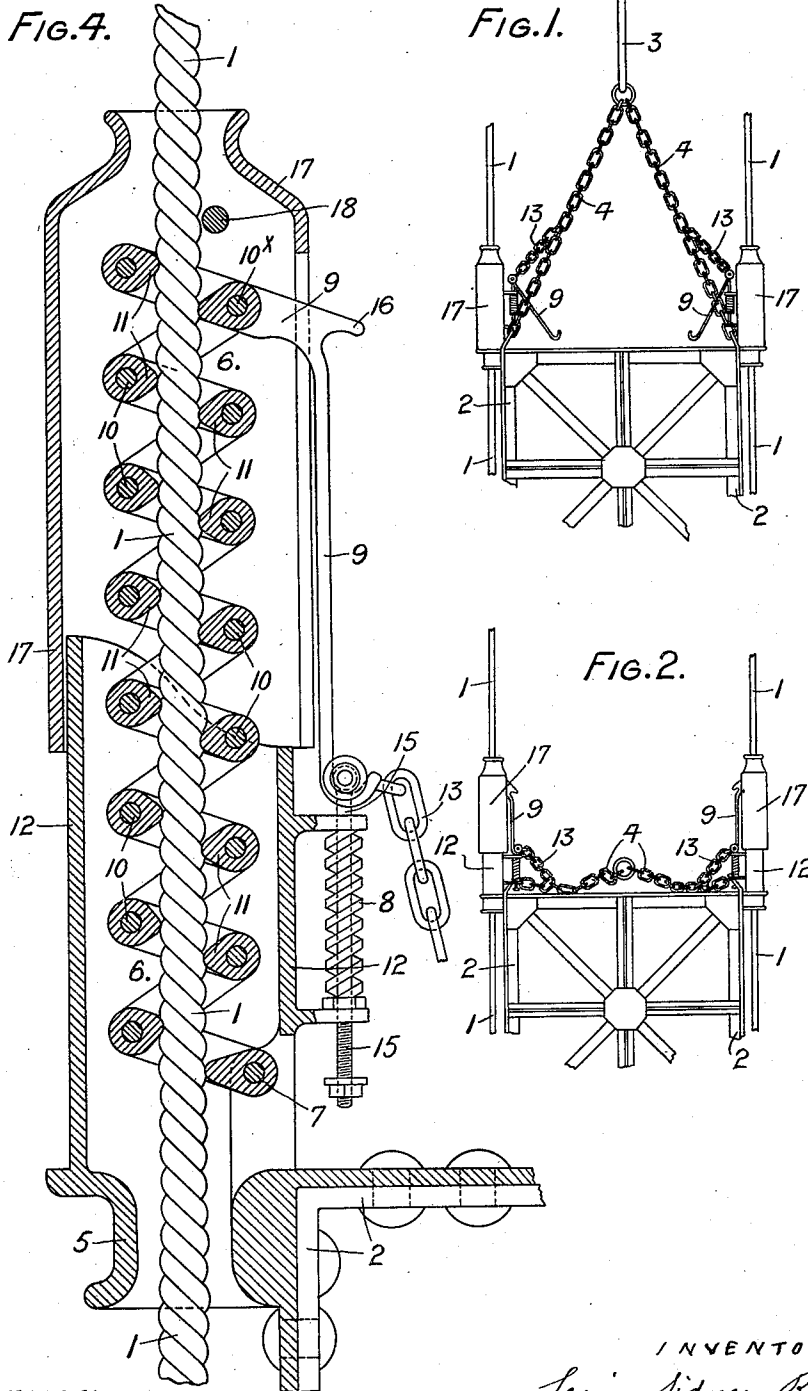


L. S. RAYNER.
MINE OR LIFT CAGE SAFETY GRIPPING APPARATUS.
APPLICATION FILED NOV. 11, 1911.

1,031,819.

Patented July 9, 1912.

2 SHEETS—SHEET 1.



WITNESSES:

John C. Sanders
John A. Percival.

INVENTOR:

Louis Sidney Rayner,

BY

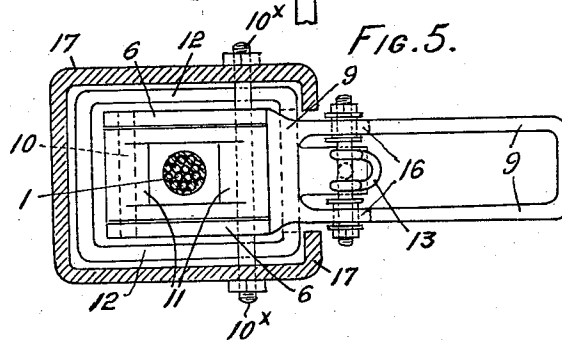
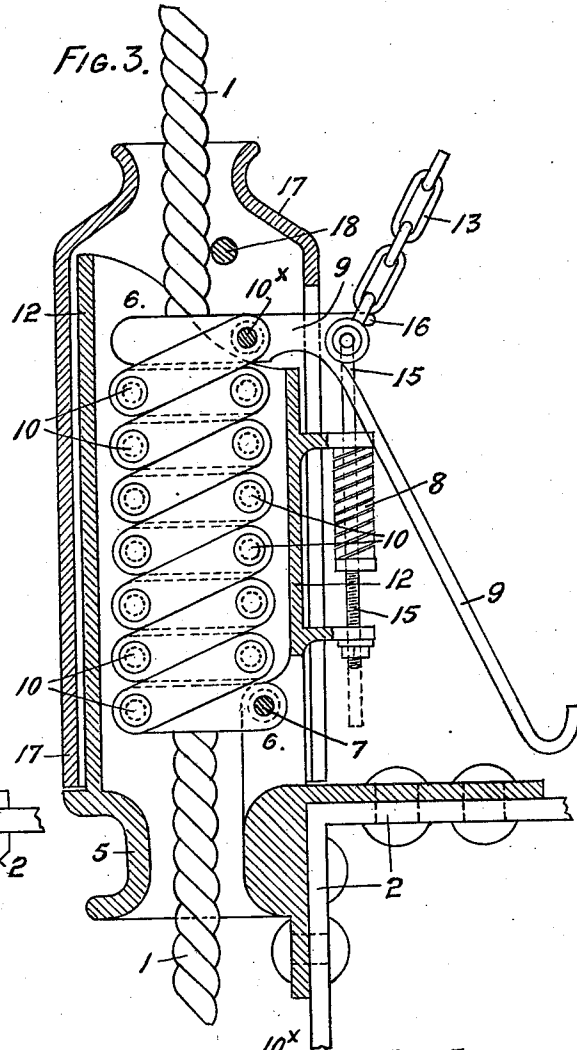
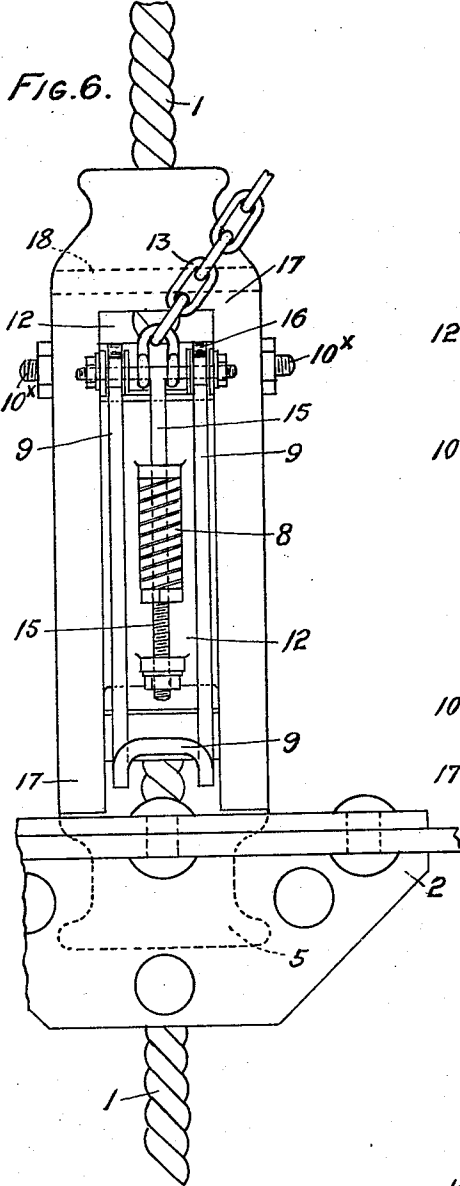
Wm. Mallon Allen

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UNITED STATES PATENT OFFICE.

LOUIS SIDNEY RAYNER, OF CAERGWRLE, ENGLAND.

MINE OR LIFT CAGE SAFETY GRIPPING APPARATUS.

1,031,819.

Specification of Letters Patent.

Patented July 9, 1912.

Application filed November 11, 1911. Serial No. 659,750.

To all whom it may concern:

Be it known that I, LOUIS SIDNEY RAYNER, a subject of the King of England, residing at Caergwrle, North Wales, United Kingdom of Great Britain, have invented certain new and useful Improvements in or Connected with Mine or Lift Cage Safety Gripping Apparatus, of which the following is a specification.

This invention has reference to apparatus for preventing accidents through the falling of cages or lifts, such as are used in mine shafts, or for equivalent or analogous purposes, due to the breaking of the lifting ropes or chains; and has reference particularly to apparatus of this character, which comprises toggle or articulated levers disposed on the guide rope of the cage, and adapted to be extended longitudinally and to be moved on to the rope for gripping it, through the medium of a spring or weight, and it has for its primary object to provide improvements in connection with same, by which, while the action shall be reliable in all respects, in case of a breakage of the lifting rope or chain, the liability of the guide ropes, rods, or the like, by which the cage or lift is guided in its travel up and down, to become damaged or broken by the action of the safety appliances, which act in connection with such ropes, rods, or the like shall be practically non-existent.

Under this invention, one end of the appliance or device of the kind referred to is connected to the cage, while the other end has connected with it a spring or weight, and levers or connections, which when the lifting rope breaks, are allowed to come into action, and produce the initial grip at this other end on the guide rope or rod, so that the weight of the cage, when it falls, expands, and extends the device, and produces the gripping action; and thus the full weight of the cage acts to expand or extend the device as a whole, and produces the gripping and braking pressure and action.

In the following description of a cage or lift, the improvements hereunder are comprised; and they are illustrated in the accompanying drawings; and the invention will be described with reference to and by the aid of these drawings.

In the drawings, Figures 1 and 2 are elevations showing the safety gripping apparatus applied to a mine or lift cage. Figs. 3 and 4 show the gripping mechanism in

sectional elevation in the two positions; and Fig. 5 is a plan in section of the apparatus; and Fig. 6 an elevation, viewed 90 degrees from the position or direction seen in Figs. 3 and 4.

In the drawings, 1 are the guide ropes or rods by which the cage 2 is guided in its travel up and down; 3 is the lifting rope; and 4 the chains by which the cage 2 is suspended from the rope 3.

5 represents the cage guides through which the guide ropes 1 pass, and which are secured to a suitable part of the frame or cage 2, in the case shown the upper part; and in connection with this part, there is employed a gripping device or appliance generally designated 6, one of which is disposed around or about each guide rope 1, and which when extended longitudinally, will move in on the rope 1, and grip it, and act upon it, tending to bend it, and thereby create friction and grip, instantly upon this extension taking place; so that the weight of the cage 2, which is connected to one end of the appliance or device 6 (in the case shown this being the lower end fixed at 7, to the guide 5) will, when it falls, upon the breaking of the rope 3 or chains 4, expand or extend the device, and cause the action referred to, the initial gripping action of the device or apparatus 6, upon the breaking of the rope or suspending means, being effected through a spring 8, and lever 9, or equivalent connections.

The form of the gripping appliance 6, shown in the drawings, consists of a plurality of double articulated links, which come on each side of the rope 1, and are hinged together by hinge joints 10, which come outside the rope; and at these joints are provided with devices 11, in the form of rollers, with one side projecting inward. Normally, these links are folded together as shown in Fig. 3, with the hinge pins on the opposite sides of the rope, which passes through the spaces between the links. The appliance or means in this form is similar somewhat to an articulated sprocket chain. The upper end, *i. e.* the uppermost link, of the device or appliance 6, has connected with it, the lever 9; and the lower end of the link appliance 6, as stated, is hinged to a part connected with the cage, namely, the upwardly extending part 12 on the guide 5.

The suspending or lifting chains 4 connected with the cage, have special links 13

connected with them, which under normal conditions, will hold the upper levers or links 9 up, and the springs 8 under stress; so that the gripping and holding device 6, will be thereby maintained in its normal and inoperative or idle position when all things are normal, but in a position for instant action upon emergency, namely, when the chains 4 or the lifting rope 3 break. If this should take place, each of the levers or links 9, will be moved down by a spring 8, and the upper lever or link 9, which is connected to the spring through the rod 15, and jaw portion 16 of the lever, will be pulled down by the spring, and the upper link of the appliance 6 being hinged, and connected to this lever, will not be pulled down, but moved or canted about the hinge 10* to an angle which will cause the gripping device, namely the upper devices 11 of the upper links to engage with the rope 1, and so that through the other links and parts, the cage is immediately brought to rest. The gripping parts or devices 11 below the upper ones, are brought into action in sequence, due to the gripping of the upper ones, with the rope, and the fall of the cage, which brings these latter gradually but firmly into action. That is to say, when once the upper parts of the gripping appliance 6 are brought into contact with the opposite sides of the rope 1, the grip will be such, that this upper end will be held to such a degree, or retarded in movement over and down the rope 1 to such an extent, that it will hold back this upper part as the cage falls; and so the other parts of the gripping appliance are brought into action at first gently, and then more firmly, and with such a degree of pressure and grip, that they will hold the cage. After the spring 8 has canted or moved the upper lever or arm 9 as described, it moves out of the jaw 16, and down the lower or outer downwardly inclined portion of the lever the extremity of which is hooked; and into which hook, the connecting part between the rod 15 and the links 13, will enter, as shown in Fig. 4. In this position the spring 8 is extended.

The upper part of the appliance 6, when the apparatus is in action, will be within the guide case 17; and the upper hinge pin 10* of the arm 9 and the upper links, pass through this case 17, and form a fulcrum to this lever, which is in double form, as shown in Fig. 6. A further pin 18 is pressed through the case 17, near the rope 1, and it holds the rope up to the upper gripping devices, when they are first applied.

In some cases where desired, in lieu of the articulated form of gripping device 6 being employed, it may be in the form of a coil or the like, or other flexible or expandable device or means passed around or enveloping the rope, and which upon extension and coiling, acts in the manner referred to.

sion and coiling, acts in the manner referred to.

While the invention has been described mainly as applied to mine or lift cages, it may be used in connection with haulage clips or gripping devices, and similar apparatus.

What is claimed is:—

1. Safety gripping apparatus comprising a mine or lift cage, an extendible appliance which is expanded by the weight of the cage after being initially and partly opened up, and which has one end connected with the cage and the other end free, a part connected with the free end of the appliance and independent of the cage, a lever connected with the free end of the appliance and pivotally mounted on said part, and means for initially opening up the expanding appliance.

2. A safety gripping apparatus for mine or lift cages, comprising a cage, an articulated gripping device which is expanded by the weight of the cage and is connected at one end with the cage and has the other end free, a part connected with the free end and independent at the cage, a lever connected with the free end and pivotally mounted on the said part, and a spring which serves to initially operate the lever and to permit the gripping device to be expanded by the weight of the cage, the said spring moving independently of the free end of the appliance and the lever which it serves to initially operate.

3. Mine or lift cage safety gripping apparatus comprising the combination of a guide rope; a cage; a guide on the cage, an articulated gripping appliance having one end fixed to the guide and the other end free; an operating lever connected to the free end; a case disposed around the rope and over the guide, and independent of the cage and having a pivot bearing for the lever; and a spring connected with the guide for initially operating the appliance previous to its full expansion by the weight of the cage.

4. Mine or lift safety gripping apparatus, comprising in combination a guide rope; a cage; a guide on the cage; an articulated gripping appliance having one end fixed to the guide and the other end free; an operating lever connected to the free end; a case disposed around the rope and over the guide, and independent of the cage and having a pivot bearing for the lever; and a spring connected with the guide for initially operating the appliance previous to its full expansion by the weight of the cage, and having a bearing for the lever; a spring connected with the guide for initially operating the appliance previous to its full expansion by the weight of the cage; and a pin carried by the case for holding the ap-

pliance in its proper position relatively to the guide rope.

5 5. Mine or lift safety gripping apparatus, comprising in combination a guide rope; a cage; a guide on the cage; an articulated gripping appliance having one end fixed to the guide and the other end free; an operating lever connected to the free end, and having a jaw portion which serves in holding the appliance in the inoperative position; a case disposed around the rope and over the guide, and independent of the cage and having a pivot bearing for the lever; and a spring connected with the guide for initially operating the appliance

previous to its full expansion by the weight of the cage and having a bearing for the lever; a spring connected with the guide for initially operating the appliance previous to its full expansion by the weight of the cage; and a pin carried by the case for holding the appliance in its proper position relatively to the guide rope.

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

LOUIS SIDNEY RAYNER.

Witnesses:

SOMERVILLE GOODALL,
JOSEPH D. HUNTER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."