

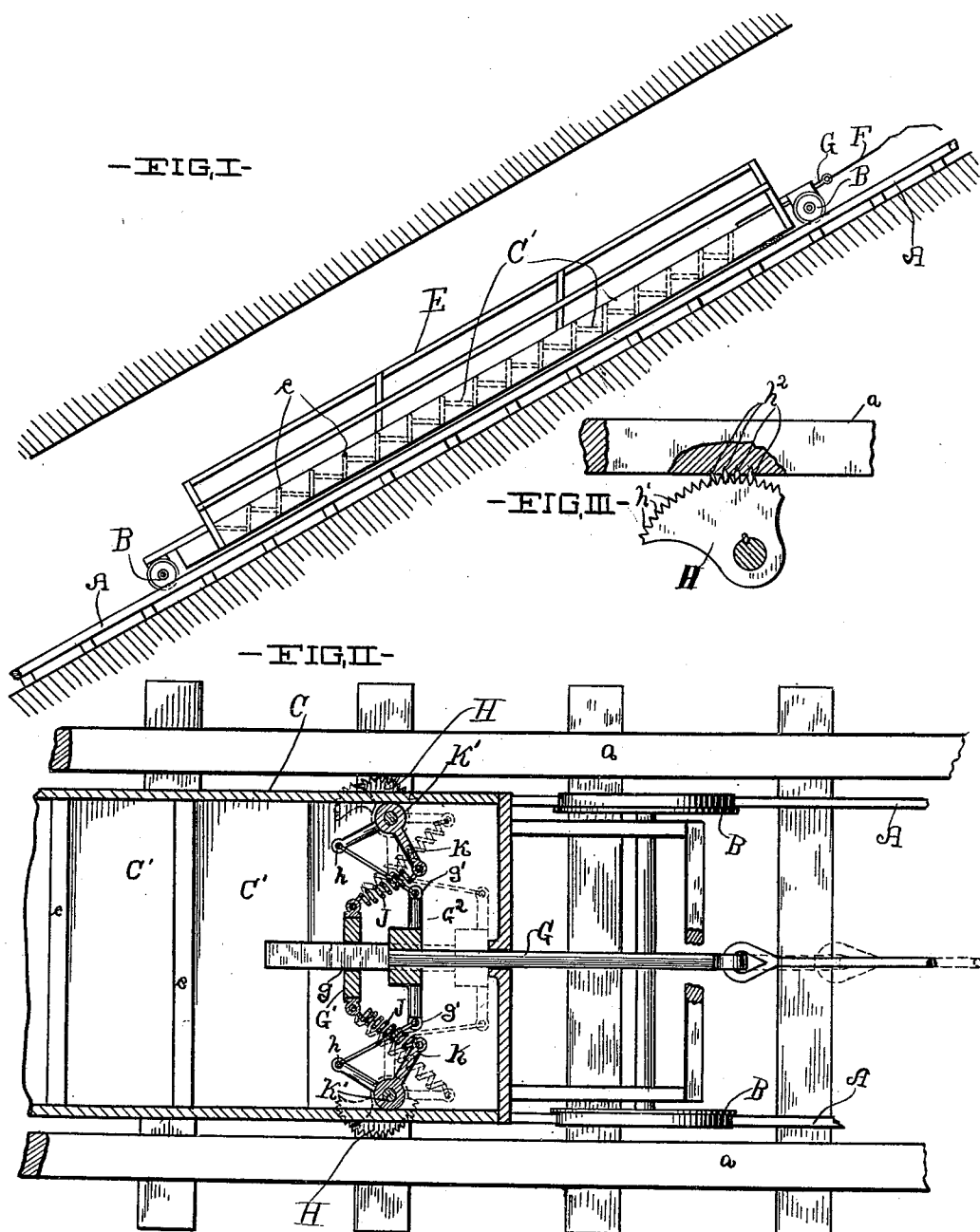
No. 643,674.

Patented Feb. 20, 1900.

J. MUIRHEAD.
MINE ELEVATING APPARATUS.

(Application filed Feb. 6, 1899.)

(No Model.)



WITNESSES:
Daniel E. Daly.
A. H. Parrott.

INVENTOR
John Muirhead
BY
Lynch Hoover & Spennell
ATTORNEYS.

UNITED STATES PATENT OFFICE.

JOHN MUIRHEAD, OF LAURIUM, MICHIGAN.

MINE ELEVATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 643,674, dated February 20, 1900.

Application filed February 6, 1899. Serial No. 704,721. (No model.)

To all whom it may concern:

Be it known that I, JOHN MUIRHEAD, a resident of Laurium, Houghton county, and State of Michigan, have invented certain new and useful Improvements in Mine Elevating Apparatus; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

My invention relates to safety appliances for use in connection with mine elevating apparatus and to arrest the descent of the car in case the hoisting-cable breaks or the car otherwise escapes from the control of the same.

My invention consists in catch devices and their operative connection with the hoisting rope or cable, so that a release of the tension upon the hoisting rope or cable, either through breakage or otherwise, will result in "setting" or releasing the clutch devices, thus stopping the carriage or cage.

My invention further consists in the peculiar construction of the safety-clutches, whereby the same are caused to act positively and quickly, as will be hereinafter fully set forth.

In the drawings, Figure I is a view, in sectional side elevation, of a mine-shaft in which is shown my improved cage or carriage. Fig. II is a plan view illustrating a portion of the cage or carriage tracks or guideways and showing the construction of the safety apparatus and its connection with the hoisting cable or rope. Fig. III is a detail view illustrating the construction of the clutch or safety-cam operating in connection with the guide-rail.

A represents rails upon which the wheels of the cage runs. Rails A are preferably formed of timbers, but may be formed of other suitable material. At the side of rails A are provided vertical flanges *a*, which act as side guards for the carriage or cage and also as purchases for the safety devices, to be hereinafter explained.

C represents a carriage or cage which is provided with wheels or trucks B, (preferably four in number,) suitably mounted upon axles which are in turn mounted in bearings at the respective ends of the cage or carriage C. The cage or carriage C is provided with

a series of steps C'. The platforms of the steps C' are provided at their front edges with guard-cleats *c*, the object of which is to guard against the slipping of the passengers or the load over the edges of said platforms. Side rails E, which also constitute guard and hand rails, are provided to the cage or carriage C.

F represents a rope or cable which is employed to elevate and lower the carriage or cage C. The rope or cable F is properly connected to a proper windlass (not shown) for hoisting and lowering of the carriage or cage C. This part of the mechanism may be varied according to the facilities at hand.

G represents a draw-head which is connected to one end of the carriage or cage C. The draw-head G is square in cross-section and is mounted at one end in a square bearing *g*, formed in a block G', (which is in turn secured to the carriage or cage C,) so as to be longitudinally movable therein. The draw-head G is prevented from rotating by the square bearing *g*. The draw-head G is provided at its outer or free end with a suitable eye or other means for connecting to it the cable or rope F.

G² represents a cross-head which is connected to the inner end of the draw-head G in such a manner as to move with it.

The cross-head G² is connected at its ends *g' g'* with arms *h h*, which are connected to and form part of the safety or catch devices, which are constructed as follows: H H represent two safety or cam catches which are preferably pivoted beneath the cage or carriage C in such a manner that their serrated or roughened surfaces will project to engage the rails or vertical flanges *a*. The cams H are held in engagement with flanges *a* by springs J J, which are secured to arms K K. The arms K K in turn are secured to the pivots or pintles K', which constitute the supporting and operating shafts of the cams or catches H H. The arms *h h* are also connected to the pintles K K.

As heretofore stated, the cams or catches H H are provided with roughened or serrated engaging faces *h'*, (see Fig. III,) and in addition to the serrations *h'* I also provide engaging teeth *h²*, which project beyond the serra-

tions h' . The teeth h^2 are preferably pointed or formed sharp at their free ends, so as to quickly engage the said rails a and cause the cams or catches H to positively engage the said side rails and hold the car or carriage.

The operation of my device is as follows: When the cable F is taut, (and not slack or broken,) the draw-head G and its connected mechanism assumes the position illustrated by dotted lines in Fig. II, and therefore the cams or catches H H are out of engagement with the rails a or, in other words, free from said rails, and this allows the car or carriage C to be free to move either up or down the shaft of the mine. If, however, there is a sudden slack of the cable F or if the said cable should break, the draw-head G and its attached mechanism, with clutches H H , will assume the position illustrated by solid lines in Fig. II and cause the clutches H H to engage the side rails a a and stop the car or carriage and hold the same from "running away." Thus it will be seen that I have provided a simple and positive safety device or mechanism which may be relied upon, the teeth h^2 assuming engagement of the cams or clutches with the rails a a .

What I claim is—

1. The combination with a mine-shaft; a car movable up and down the said shaft; a draw-head carried by the car and arranged longitudinally of the shaft; a car-propelling cable operatively connected with the draw-head; and a beam arranged longitudinally of the shaft, out of the way of the path of the car; of a cam-shaped brake, having a serrated face provided with several pointed teeth projecting beyond the serrations, supported from the car and arranged as required to render it capable of biting or clutching the said beam upon oscillating it in one direction; two arms rigid with said cam-shaped brake, and projecting laterally from the axis of said brake and arranged at right angles, or at approximately right angles, to each other; a link operatively connecting one of the said arms with the draw-head; and a spring connected at one end to the other arm, and having its opposite end attached to the car, all

arranged and operating as described and for the purpose set forth.

2. The combination with a mine-shaft; a car movable up and down the said shaft; a draw-head carried by the car and arranged longitudinally of the shaft; the car-propelling cable operatively connected with the draw-head; of a beam arranged longitudinally of the shaft out of the way of the path of the car, an oscillating cam supported from the car and arranged as required to render it capable of biting or clutching the said beam, upon oscillating it in one direction; two arms rigid with said cam, and projecting laterally from the cam's axis and arranged at right angles or approximately at right angles to each other; a link operatively connecting one of the arms of said cam with the draw-head, and a spring connected, at one end, to the other arm and having its opposite end attached to the car, all arranged and operating substantially as shown, for the purpose specified.

3. The combination with a mine-shaft; a car movable up and down in said shaft; a draw-head carried by the car and arranged longitudinally of the shaft; the car-propelling cable operatively connected with the draw-head; of two beams arranged at opposite sides, respectively and longitudinally of the shaft; two oscillating cams supported from the car and arranged as required to render them capable of biting or clutching the different beams, respectively, upon oscillating them in one direction; two arms rigid with each cam, and projecting laterally from the cam's axis and arranged at right angles or approximately at right angles to each other; a link operatively connecting one of the arms of each cam with the draw-head, and a spring connected, at one end, to the other arm of each cam and having its opposite end attached to the car, all arranged and operating substantially as shown, for the purpose specified.

Signed by me at Calumet, Michigan, this 28th day of December, 1898.

JOHN MUIRHEAD.

Witnesses:

WILLIAM A. BATEMAN,
ANNIE O'BRIEN.