

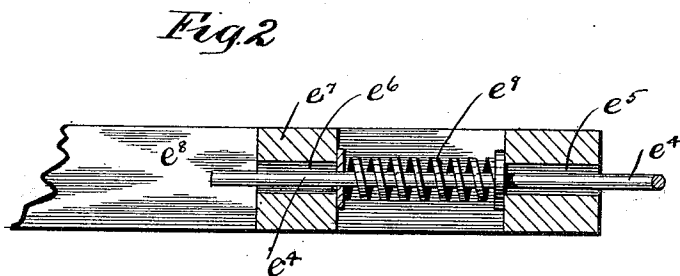
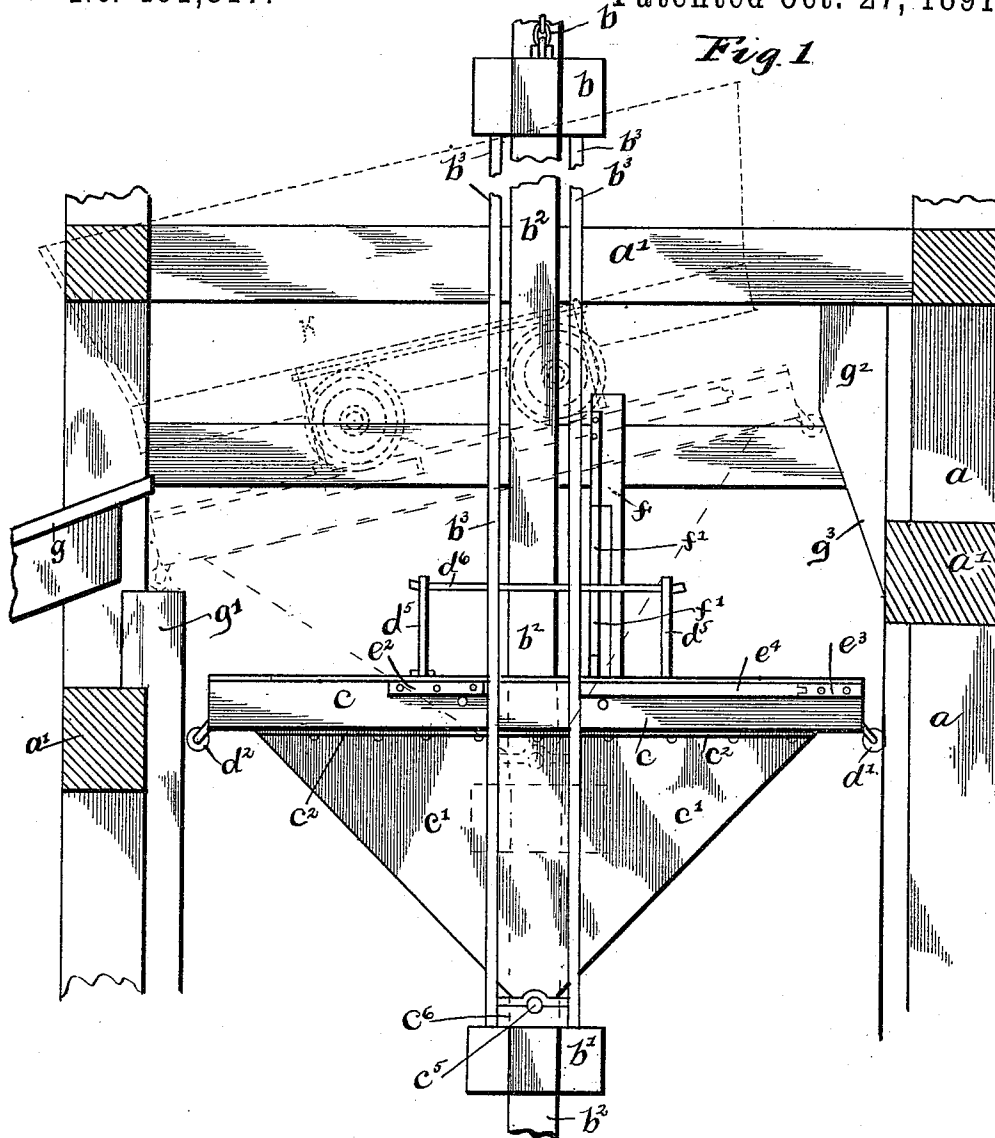
(No Model.)

2 Sheets—Sheet 1.

M. S. COYAN.
SELF DUMPING MINE CAGE.

No. 461,817.

Patented Oct. 27, 1891.



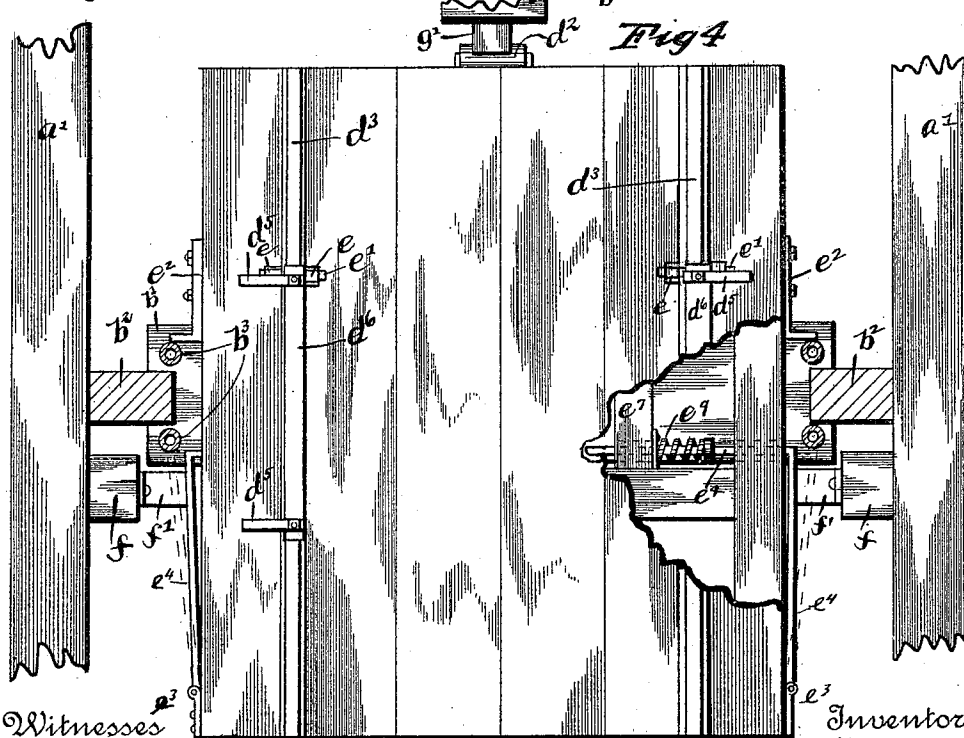
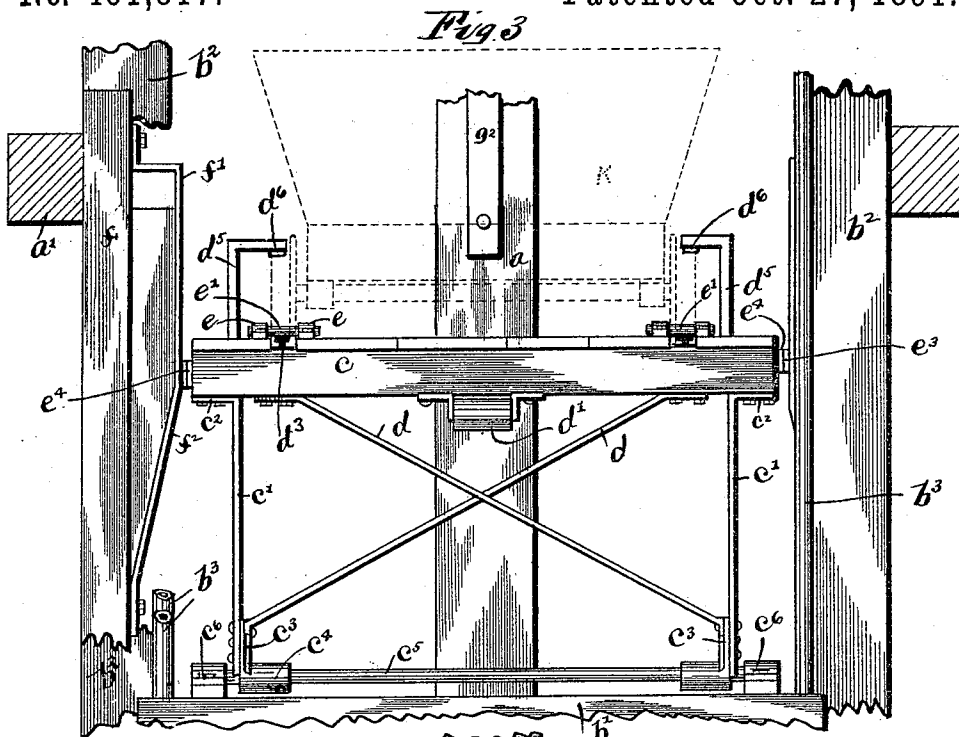
Witnesses
E. C. Bragg
J. A. Travel

Inventor
Milton S. Coyan
By his Attorneys
Staley and Shepherd

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UNITED STATES PATENT OFFICE.

MILTON S. COYAN, OF CORNING, OHIO, ASSIGNOR OF ONE-HALF TO FRED-
ERICK MILLER, OF SAME PLACE.

SELF-DUMPING MINE-CAGE.

SPECIFICATION forming part of Letters Patent No. 461,817, dated October 27, 1891.

Application filed March 12, 1891. Serial No. 384,839. (No model.)

To all whom it may concern:

Be it known that I, MILTON S. COYAN, a citizen of the United States, residing at Corning, in the county of Perry and State of Ohio, have invented a certain new and useful Improvement in Self-Dumping Mine-Cages, of which the following is a specification.

My invention relates to the improvement of cages of that class used in elevating coal or other mine products from a mine-shaft; and the objects of my invention are to provide a mine-cage of this class in which, in conjunction with the hoisting-frame and certain mechanism connected therewith, a superior means is had for automatically dumping the coal from the mine-car which is upon said cage; to provide a simple and reliable dumping or tipping mechanism for said cage of such construction as to prevent liability of accidents arising from the tipping of the cage in its ascent in the shaft; to provide superior means for supporting the mine-car upon the cage during the tipping or dumping process, and to provide other improvements, which will be more specifically pointed out hereinafter. These objects I accomplish in the manner illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of my improved cage supported in the hoisting-frame a short distance below the tipping point, showing said hoisting-frame partially in section and showing in dotted lines the position of the cage and its car during the dumping or tipping process. Fig. 2 is a detail sectional view of a portion of the cage top or platform, showing the inner spring-actuated portion of one of the locking-triggers. Fig. 3 is a front view of my improved cage, showing the cage-locking triggers released and a portion of the hoisting-frame broken away on one side for the sake of clearness and showing in dotted lines a front end view of a mine-car supported upon the cage; and Fig. 4 is a plan view of my improved cage, showing in full lines the locking-triggers released and showing in dotted lines the position of said triggers when the same is locked against tipping.

Similar letters refer to similar parts throughout the several views.

$a\ a'$ represent, respectively, portions of the vertical and cross-frame pieces or beams, which constitute the usual hoisting-frame work, which rises from the mouth of the mine-shaft and within which the cage is elevated in the usual manner.

$b\ b'$ represent, respectively, the upper and lower cage cross-heads, the notched ends of which receive and slide against the vertical guide beams or posts b^2 , said guides extending upon the undersides and attached to the cross-pieces a' of the hoisting-frame at the opposite points in the well-known manner. The upper and lower cross-heads $b\ b'$ have their end portions connected near each of the inner sides of the hoisting-frame by two vertical parallel rods b^3 , as shown, the rods of each pair thus used extending, respectively, on opposite sides of one of the guides b^2 . From the upper side of the cross-head b extend the usual supporting-chains b^4 , which are connected in the usual manner with the desired hoisting mechanism above. c represents the cage-platform, which consists of a suitable frame-work and flooring.

c' represent angular side plates, one of which has the outturned flange c^2 of its upper and longer edge secured to the under side of each of the side beams of the platform c . Each of these angular plates c' is thickened on its inner side at its apex or lower point, as shown at c^3 , said thickened portion having formed therewith an inwardly-extending bearing-piece c^4 . Through the bores or hollow pieces c^4 extends loosely a transverse shaft c^5 , the outer projecting ends of which are journaled in suitable boxes c^6 , which are supported upon the upper side of the lower cross-head b' , said shaft thus forming a pivotal or journal support for the cage. As shown in the drawings, strengthening brace-rods d may be employed in the construction of the cage-rods, extending diagonally from the under sides of the transverse beams of the cage-platform to the upper sides of the thickened portion c^3 of the plate c' . From the lower side of and at the center of the width of each end of the cage-platform I journal within suitable depending brackets bearing-rollers, which are indicated at d' d^2 , said

rollers being so supported as to project slightly beyond the ends of the cage.

d^3 represent the usual track-rails, which extend from end to end of the cage-platform flooring, and being supported upon the cross-beams thereof have their upper sides flush with said flooring. Rising from the upper side of the flooring of the platform on the outer side of each of the track-rails are two guide-arms d^5 , which are arranged at equidistant points from the center of the length of the platform and which have their upper end portions bent inwardly and terminating over the adjacent track-rails, thus forming angular arms, as shown. Each pair of said angular arms have their upper and inner ends connected by a horizontal bar d^6 , which extends parallel with and above the track-rail. On the opposite sides of each of the track-rails opposite each of the arms d^5 are supported upon the platform metal keepers e , through each pair of which is normally inserted a transverse bolt e' , which crosses the track-rail, as shown.

Affixed to each side of the outer side beam of the platform c in the forward half of said platform is the longer side of an angular stop-bar e^2 , the forward and outturned end of which normally abuts against the forward connecting-rod b^3 and operates to lock the cage from tipping rearwardly. To the outer side of the beams of the platform c , I also affix adjoining the rear end thereof a short hinge-plate e^3 , to the forward end of which is hinged a forwardly-extending angular arm or trigger e^4 . Each of these trigger-arms extends forwardly to a point opposite the rear side of the rear rods b^3 , from which point it extends inward, passing loosely through the slotted openings e^5 e^6 , formed, respectively, in the outer side beam and extending between the transverse platform-beams e^8 . Those portions of the trigger-arms e^4 which extend inwardly, as described, are preferably rounded in the form of rods, as shown in Fig. 2 of the drawings. Surrounding the rod-shaped portion of each trigger e^4 and bearing between the outer side beam and the inner beam e^7 is a coiled spring e^9 .

To the inner sides of the elevating or hoisting frame-pieces a' , I affix in rear of the side guides b^2 a vertical frame-bar f . To the inner side of each of the frame-pieces f , I secure the upper end of a trip-bar f' , which, extending inwardly a short distance from its point of attachment, extends vertically downward parallel with the inner face of the frame-piece f to about one-half of its length, and from the lower termination of this vertical portion extends downwardly and inwardly on a gradual incline, as shown at Fig. 2, and has its lower end connected with the inner face of said frame-piece f at a point below the dumping-point. As shown in the drawings, each of the trip-bars f' extends inward slightly beyond the position of the rods b^3 .

g represents the inner end portion of a coal-

chute, which, as shown, projects slightly within the hoisting-frame on that side on which arises what I have termed the "front" end of the cage, said chute being inclined downwardly from said hoisting-frame in the usual manner.

g' represents a tipping beam, which is secured vertically on the inner side of the central portion of the forward cross-beams a' and has its upper squared end terminating at a point below the inner end of the chute g . Against the inner surfaces of the rear or outer side of the hoisting-frame I secure a pressure-block g^2 , the inner face of which is vertical, as shown from its upper end, to a point about the center of its length, from which point said block is inclined inwardly and downwardly to meet the hoisting frame-work at a point horizontally opposite the upper end of the tipping post g' .

Upon the cage-platform, with its wheels resting upon the tracks d^4 thereof, is adapted to be supported, as shown in dotted lines in Figs. 1 and 3 of the drawings, an ordinary mine-car k , which is preferably of that class which have their forward ends swinging upward to discharge the coal therefrom.

For convenience in placing the car upon the track the bolts e' are withdrawn from their keepers and again replaced after the forward wheels of the car are in rear of their points of insertion. The guard-arms d^5 and their connecting-bars d^6 extend to such height from the upper side of the cage-platform as to allow the wheels of the car to roll between said connecting-bars and the tracks without binding.

The operation of my device is as follows: The cage, upon which is supported, as described, a car of coal or other mine product, is elevated in the usual manner in the hoisting-frame until the platform of said cage is within a short distance of the upper end of the tipping post g' , at which point the triggers e^4 are released from engagement from the rods b^3 by coming in contact with the inclined lower portion of the tripping-bars f^2 . The cage continuing upward until its end rollers reach, respectively, the upper end of the tipping post g' and the lower end of the pressure-block g^2 , it will be seen that as the roller d^2 travels upward against the inclined face of the block g^2 the forward roller d' will travel over upon the upper side of the tipping post g' and the rear portions of the cage-platform, and the car will be elevated to the position shown in dotted lines in Fig. 1 of the drawings. This movement brings the forward end of the car against or within close proximity to the upper side of the coal-chute g , and, when the forward end of said car-door is opened in the usual manner, will result in the coal being discharged from said car into said chute by gravity. During this tipping movement it will be seen that the car will be prevented from running off the track by the bearing of the forward wheels against the

stop-bolts e' , and that said car will be prevented from turning over into the chute by the contact of its wheels with the guard-bars d^6 . As the movement of the usual cage-hoisting mechanism is reversed, it will be seen that the cage, if descending, will gradually resume a horizontal position, which will be attained when its rollers will have cleared the upper end of the tipping post g' and the lower end of the pressure-block g^2 . It will also be seen that soon after said cage has resumed its normal position, as described, its triggers e^4 will be released from contact with the tripping-bars f' , thus allowing the triggers to spring outward to the position shown in dotted lines in Fig. 4 of the drawings, which will result, as shown, in the contact of said triggers and the rods b^3 in locking the cage against further tipping movement.

From the construction shown and described it will be seen that the tipping of the cage at the upper portion of the hoisting-frame will be accomplished automatically, and that during the descent and ascent of the cage in the mine-shaft said cage will be securely locked from the tipping movement. It will also be observed that by my construction simple and effective means are provided for retaining the car upon the cage during the tipping movement, and that said device is constructed in a reliable, simple, and inexpensive manner.

Having now fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a mining-cage, the combination, with the cage and means for hoisting the same, cross-heads b b' , rods b^3 , connecting, as described, said cross-heads on opposite sides of the cage, and fixed angular bars e^2 , abutting, as described, against the forward rod b^3 , of trigger-bars e^4 , abutting against the rear rods b^3 , as described, and having their outer ends hinged to the cage-frame and their inner ends cushioned by springs e^3 within the frame-work of the cage, the hoisting-frame, and projections thereon adapted to press said triggers from engagement with said rods as the cage

is elevated within said frame, substantially as specified.

2. In a self-dumping mining-cage, the combination of the cage pivotally supported between the cross-heads, cross-heads-connecting rods b^3 on opposite sides of said cage, as described, fixed side stop-bars e^2 , abutting against the forward rods b^3 , and angular trigger-bars e^4 , abutting against the rear rods b^3 , as described, the outer ends of said trigger-bars hinged to the cage and their inner ends cushioned by springs, as described, within the frame-work, and the partially-vertical and partially-inclined tripping-bars f' , projecting inwardly from the opposite sides of said hoisting-frame and adapted to press inward the trigger-bars e^4 by contact therewith as the cage rises within the hoisting-frame, substantially as specified.

3. In a mining-cage, the combination of the cage pivotally supported between the cross-heads, as described, connecting-bars b^3 on opposite sides of said cage, angular stop-bars e^2 , fixed on opposite sides of the cage-platform and normally abutting against the forward rods b^3 , angular trigger-bars e^4 , normally abutting against the rear rods b^3 and having their outer ends hinged to the cage-frame and their inwardly-extending ends cushioned by springs within the cage-frame, as described, and cage end rollers d' d^2 of the hoisting frame-work, a chute inclined from the forward side thereof, tripping-bars f' , projecting, as described, from the frame-work and having their vertical and inclined faces adapted to press inward the trigger-bars e^4 by contact therewith as the cage is elevated within the frame, a tipping post g' , having its upper termination beneath the inner end of said chute, and an inclined pressure-block g^2 on the opposite side of said hoisting-frame, substantially as specified.

MILTON S. COYAN.

In presence of—

BARTON GRIFFITH,
C. C. SHEPHERD.