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CAR RETAINING DEVICE FOR MINE CAGES.

APPLICATION FILED OCT. 25, 1915.

1,187,151.

Patented June 13, 1916.

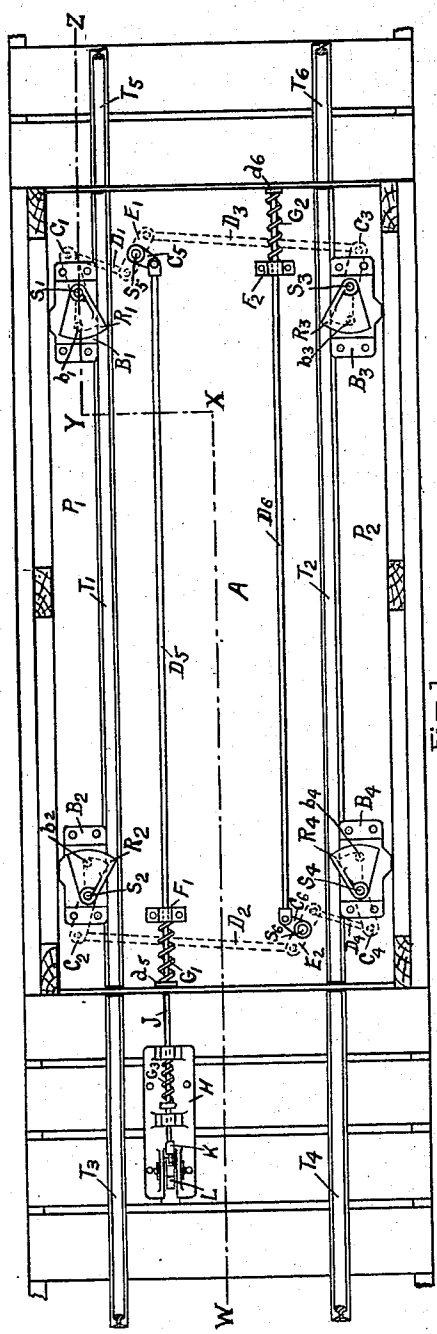

Fig. 1.

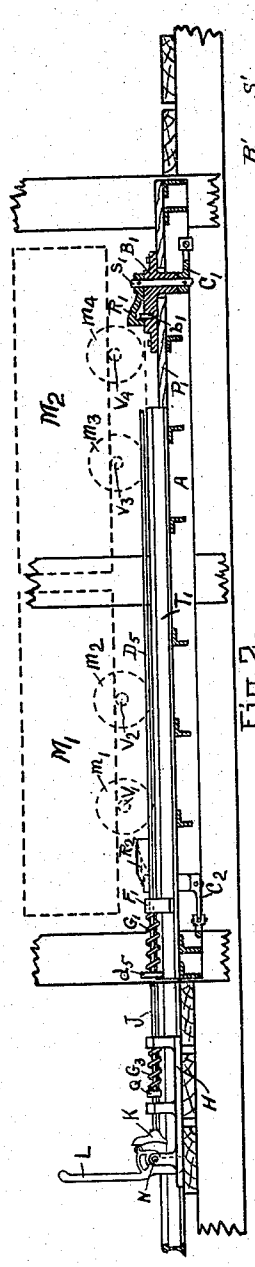

Fig. 2.

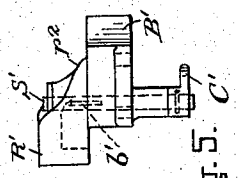

Fig. 5.

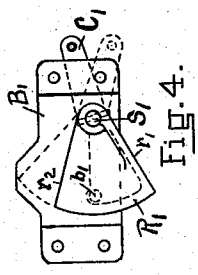

Fig. 4.

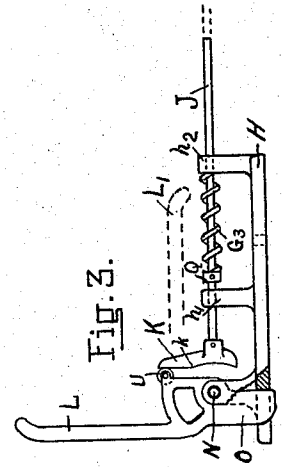

Fig. 3.

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CAR-RETAINING DEVICE FOR MINE-CAGES.

1,187,151. Specification of Letters Patent. Patented June 13, 1916.

Application filed October 25, 1915. Serial No. 57,782.

To all whom it may concern:

Be it known that I, GEORGE M. JOHNSON, a citizen of the United States, residing at McDonald, in the county of Washington and State of Pennsylvania, have invented certain new and useful Improvements in Car-Retaining Devices for Mine-Cages, of which the following is a specification.

My invention relates to car retaining devices for mine cages and especially to such devices as are adapted to be operated automatically by the movement of cars approaching the cage.

The objects of my invention are to provide a system that will facilitate the movement of cars on and off the cage, to reduce the labor of such movement, to permit the caging of any desired number of cars at one time, to provide for such operation by cars moving in either direction and to provide a retaining device that cannot be clogged or blocked by material that may fall from the cars or otherwise be scattered over the rails or floor of the cage.

My invention consists of an operating lever adapted to be engaged by the cars approaching the cage, a cam operated by the said lever, retaining blocks automatically operated by the car wheels to permit a car to enter the cage and operated by the movement of the said cam to permit a car to pass from the said cage the said retaining blocks and their supports being so shaped that they cannot be clogged or blocked by material that may fall from the cars, and a system of connections whereby the said retaining blocks are properly operated in the desired manner.

In the drawings which illustrate my invention, Figure 1 is a plan view of a lifting cage adapted to hold two mine cars and of the tracks leading to and from the said cage, showing the application of my invention. Fig. 2 is a vertical section of the same apparatus taken along the line W—X—Y—Z in Fig. 1, showing in dotted lines the position of the cars upon the cage. Fig. 3 is a side view of the operating lever, cam and push-rod in normal position, showing in dotted lines the position of the end of the lever and the end of the push-rod when the lever is depressed. Fig. 4 is a plan view of one of the retaining blocks with the bearing block and operating crank connected thereto. Fig. 5 is an end view of the parts shown in Fig. 4, the said Fig. 5 being a first angle projection of the said Fig. 4.

In the drawings, A represents the cage of a mine hoist carrying the track rails T, and T_2. The track rails T_3 and T_4 form the track by which the cars are brought to the cage A and the track rails T_5 and T_6 form the track by which the cars are taken away from the cage A.

M_1 and M_2 represent in dotted outline two mine cars on the said cage A. The wheels of these cars are represented by the dotted out-lines m_1, m_2, m_3 and m_4 and the axles by V_1, V_2, V_3 and V_4.

The details of construction of the frame of the cage A form no part of my invention but the usual construction is followed in the drawing. In this construction two planks P_1 and P_2 extend from end to end of the cage A outside the track rails T_1 and T_2. Bolted to the said planks P_1 and P_2 are four bearing blocks B_1, B_2, B_3, and B_4 which act as supports for the movable retaining blocks R_1, R_2, R_3 and R_4. These retaining blocks are pinned, keyed or otherwise securely fastened to the short vertical shafts S_1, S_2, S_3 and S_4 on the lower end of which are fastened the cranks C_1, C_2, C_3 and C_4, the said cranks being below the floor of the cage A. Connected to the cranks C_1, C_2, C_3 and C_4 are the connecting rods D_1, D_2, D_3 and D_4, which form an operative connection between the said cranks and the levers E_1 and E_2 as shown in Fig. 1. These levers E_1 and E_2 as shown in Fig. 1 are mounted on and firmly fastened to the vertical shafts S_5 and S_6 which extend through the floor of the cage A. To the upper ends of the shafts S_5 and S_6 are firmly attached the cranks C_5 and C_6 to the outer ends of which are attached the operating rods D_5 and D_6. The rods D_5 and D_6 are held in proper alinement by the bearings F_1 and F_2 which are bolted to the floor of the cage A. The operating rods D_5 and D_6 are provided with enlarged ends d_5 and d_6 and the said rods D_5 and D_6 are held in their normal positions by the springs G_1 and G_2 which surround the rods D_5 and D_6 and engage the enlarged ends d_5 and d_6 and abut against the bearings F_1 and F_2. These springs G_1 and G_2 through the connections described, tend to force the retaining blocks R_1, R_2, R_3 and R_4 inward toward the center of the track and this movement is lim-

ited by the stops b_1, b_2, b_3 and b_4. These stops b_1, b_2, b_3 and b_4 are rigidly attached to the bearing blocks B_1, B_2, B_3 and B_4 or may be made integrally therewith and they engage the interior of the recesses cast in the undersides of the retaining blocks R_1, R_2, R_3, and R_4 as shown in the drawings.

Firmly fastened between the rails T_3 and T_4 leading to the cage A is the base H of the operating device, which device consists of the said base H, the push-rod J, the cam K, the actuating lever L which is pivoted on the shaft N, and the spring G_3. The push-rod J is actuated by depressing the lever from the position shown in full lines by L in Fig. 3 to the position shown in dotted lines by L_1. In so depressing the lever the roll U moves downward over the straight vertical surface of the cam K, pushing forward the cam K and the push-rod J. After the roll U passes the point k it reaches the curved surface below the point k, which surface is concentric with the pivotal shaft N about which the lever L turns. For this reason, any further movement of the lever L has no effect in moving the push-rod J. When the lever L is released the weighted end O of the said lever L returns the lever to its normal position, which action is also assisted by the spring G_3 acting on the shaft collar Q after the roll U has risen above the point k. In order that the reciprocating push-rod J shall not be rotated in its bearings h_1 and h_2, the rod and bearings may be of rectangular section or may be fitted with a sliding key or similar device.

In the construction of the bearing blocks B_1, B_2, B_3 and B_4, I provide upper flat surfaces that are flush with the upper surfaces or treads of the rails T_1 and T_2, and the underside of the retaining blocks R_1, R_2, R_3 and R_4 are made flat and are adapted to slide upon the upper surfaces of the said blocks B_1, B_2, B_3 and B_4 as they are revolved about the shafts S_1, S_2, S_3 and S_4. Referring to Figs. 4 and 5, it will be seen that the face r_1 of the retaining block R_1 which lies adjacent to the rail is a straight vertical surface while the opposite side of the retaining block R_1 is sloped or beveled to form a sharp edge r_2. This edge r_2 in passing over the bearing block B_1 serves to cut under any coal or any other material that may be lying on the upper face of the said bearing block B_1.

The operation of my invention is as follows: When all parts of the apparatus are in their normal positions as shown in Figs. 1 and 2, the cage may or may not be occupied by cars, as indicated by M_1 and M_2. Cars approach the cage on the rails T_3 and T_4 and the forward end of the leading car will move the lever L to the depressed position as indicated at L_1 in Fig. 3. The push-rod J will be moved to the right and will engage the enlarged end d_5 of the operating rod D_5, moving this operating rod against the pressure of the spring G_1, thus turning the crank C_5 and the lever E_1 in a counterclockwise direction about the shaft S_5. The movement of the lever E_1 exerts a pull on the connecting rods D_1 and D_3, turning the crank C_1 in a clockwise direction and the crank C_3 in a counterclockwise direction. The movement of the cranks C_1 and C_3 impart an outward movement to the retaining blocks R_1 and R_3, swinging them clear of the rails T_1 and T_2, thus permitting any cars on the said rails T_1 and T_2 to move from the rails T_1 and T_2 to the rails T_5 and T_6. As the approaching cars move toward the cage A the lever L is held depressed by the bottoms of the cars and the axles of the cars, the axles depressing the lever L to a greater extent than the car bottoms. The angle of the lever L will therefore vary considerably as the cars pass over it but during such movement the roll U is engaged with the curved surface of the cam K below the point k, so that such variation in the position of the lever L does not affect the position of the retaining blocks R_1 and R_3. As the cars move forward the wheels will engage the inner edges of the retaining blocks R_2 and R_4 and these blocks will be pushed outward, such movement being resisted by the spring G_2 acting through the operating rod D_6, the crank C_6, the lever E_2, the connecting rods D_2 and D_4 and the cranks C_2 and C_4. The lever L is of such length that when two or more cars are coupled together the said lever cannot rise between the cars that are so coupled.

The movement of the retaining blocks R_1, R_2, R_3 and R_4, is limited by the stops b_1, b_2, b_3 and b_4 which are rigidly fastened to or made integrally with the bearing blocks B_1, B_2, B_3 and B_4, these stops engaging with the sides of the recesses that are cast in the under sides of the said retaining blocks as indicated in the drawings.

In the operation of such a system as is herein described, the cars at a given landing of the hoisting cage always operate in the same direction and, therefore, only one operative device is required. It may frequently occur that at a lower or a higher level the direction of traffic may be reversed with respect to the cage. This condition is provided for, in the apparatus which I have invented, by arranging all parts symmetrical with respect to the center of the hoisting cage A. At the landing shown in the drawings, the push-rod J engages the enlarged end d_5 of the operating rod D_5 while at another landing the push-rod of the operating device may in like manner engage the enlarged end d_6 of the operating rod D_6.

In the operating of the retaining blocks, much trouble is caused by the said blocks becoming clogged or blocked in their movement, on account of pieces of coal or other material falling upon the floor of the cage near the said retaining blocks. In the retaining blocks that form an essential part of my invention, the outer edges of these blocks are sharp or angular so that while passing over the upper flat surfaces of the bearing blocks these edges serve to cut under any coal or other material that would otherwise be caught between the blocks and the sides of the cage or shaft and thus tend to obstruct the free motion of the retaining blocks.

I do not desire to limit myself to the exact construction and arrangement of parts here shown, but aim in the appended claims to cover all modifications that are within the scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States is—

1. In an operating device for car retaining blocks, an actuating lever, a push-rod actuated by the said lever and a cam interposed between the said lever and the said push-rod, one portion of the said cam being formed to move the said push-rod during the initial movement of the said lever, another portion of the said cam being formed to hold the said push-rod stationary during the latter part of the movement of the said lever.

2. In a car retaining device, a pair of rails, car retaining blocks adjacent the said rails, a lever for actuating said blocks and a cam interposed between said lever and said blocks, one portion of said cam being formed to impart movement to the said blocks during a part of the stroke of said lever and another portion of said cam being formed to impart no motion to the said blocks during another part of the stroke of said lever.

3. In a car retaining device, two track rails, bearing blocks outside the said rails, the said bearing blocks having flat upper surfaces in alinement with the top of said rails, vertical shafts journaled in the said bearing blocks, retaining blocks secured to said shafts and supported by said bearing blocks and means to limit the pivotal movement of the said retaining blocks about the said vertical shafts.

4. In a car retaining device, two track rails, bearing blocks outside the said rails, the said bearing blocks having upper flat surfaces in alinement with the top of said rails, vertical shafts journaled in the said bearing blocks, and retaining blocks secured to said shafts and supported by said bearing blocks, the outer surfaces of said retaining blocks forming acute angles with the said flat upper surfaces of said bearing blocks.

5. In a mechanism for the operation of car retaining blocks for mine cages, a lever adapted to be depressed by cars approaching the cage, a pair of retaining blocks at each end of the said cage, the said pair of blocks at the entering end of the cage being adapted to be moved by the wheels of the cars, a cam whereby the said pair of blocks at the outgoing end of the said cage are moved by the initial depression of the said lever and springs adapted to return the said blocks to their normal positions after the said blocks have been moved by the said wheels or the said lever.

In witness whereof I have set my hand this 23 day of October 1915.

GEO. M. JOHNSON.

Witnesses:

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SIMON F. LOEB.