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JUNCTION SIGNAL FOR MINING RAILROADS.

APPLICATION FILED MAY 15, 1909.

943,114.



Fig. 1.

Fr. 2. 17.

Ex. 2.

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UNITED STATES PATENT OFFICE.

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JUNCTION-SIGNAL FOR MINING-RAILROADS.

943,114.

Specification of Letters Patent.

Patented Dec. 14, 1909.

Application filed May 15, 1909. Serial No. 496,136.

To all whom it may concern:

Be it known that I, WILLIAM KLEMAN, citizen of the United States, residing at Portage, in the county of Cambria and State of Pennsylvania, have invented certain new and useful Improvements in Junction-Signals for Mining-Railroads, of which the following is a specification.

My invention relates to signals used at the junction of mine headings for the purpose of indicating on a cross heading that a car is proceeding along the main heading and will shortly cross the junction of the tracks leading from the cross heading on to the main line of the road.

In its general construction the invention includes a trackway upon which cars may run and depressible levers attached to the trackway in proximate contact with the sides of the rails thereof, these levers being connected by bell crank levers to a longitudinally extending rod carrying upon it a screen. Back of the screen is located a lantern or other light, so that when the rod is operated in one direction the light will be exposed and when operated in the other direction the light will be concealed. In its normal position the light is concealed denoting that there is no car about to pass the junction of the two lines of rails, but when the light is exposed, an operator in a transverse heading may see the light and thus know that a car is coming along the main track and will cross the mouth of the heading, and thus he is warned against sending forward another car down the side heading, which might arrive at the junction point at the same period with the first car and thus cause an accident which would inevitably damage the cars and might cause loss of life. Many accidents have occurred in mines on this account. The cars are generally operated by gravity and as a consequence collisions at the junctions of the headings with the main tunnel are very liable to occur. Such accidents are entirely prevented by my invention. In the drawings I have shown my invention as applied to the junctions of the transversely extending headings with the main line.

For a full understanding of the invention and the merits thereof and also to acquire a knowledge of the details of construction, reference is to be had to the following description and accompanying drawings, in which:

Figure 1 is a plan view of my invention as applied to tracks at the junction of two headings. Fig. 2 is a longitudinal face view of the signal apparatus; Fig. 3 is a perspective view enlarged showing the yielding bell crank lever; and, Fig. 4 is a fragmentary elevation of one of the rails and the adjacent track lever.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

Referring to the drawings, A designates a main track and B the side track, the main track extending up one heading and the track B extending up a transverse heading, the rails of track B joining track A in the ordinary manner, so that the cars coming out of the heading B will be shifted on to the track A, the track as usual consisting of two rails. The outer rail 2 on the track A, at points on either side of the junction of track B, is provided with laterally shiftable and vertically movable levers 3 and 4. These levers at one end are pivoted, as at 5, this pivoted connection being such that the levers may have a pivotal motion in a horizontal plane as well as a pivotal movement in a vertical plane. To this end a simple link connecting the ends of the levers with the tie is sufficient. The free ends of the levers are beveled, as at 6, so as to make contact with the rails 2, and the upper faces of the levers at their free ends are also inclined or beveled, as at 7.

Mounted upon the tie or other support adjacent to the free ends of the lever 3 is a bell crank lever 8 of peculiar construction, the details of which will be hereinafter described. Adjacent to the free end of the lever 4 is a bell crank lever 9. Both of these levers at the ends of their horizontal legs are connected to the track levers 3 and 4 by transversely extending pins 10. These pins are fast in the free ends of the levers 3 and 4 and extend through openings in the bell crank levers 8 and 9, thus the track levers can move transversely with relation to the bell cranks 8 and 9, but any vertical movement of the pins with the track levers 3 and 4 will operate the bell cranks. It, of course, will be obvious that a depression of lever 4 will operate the bell cranks reversely to a depression of lever 3. The upwardly extending legs of the bell crank levers are connected by a longitudinally extending rod 11 which

may be supported intermediate of its length by a support 12, which on its upper face is grooved or formed with an eye, so that the rod 11 will be guided therein, but may yet have perfect freedom of longitudinal movement. At that point of the rod 11 which is directly opposite to the heading B, I provide a screen 13. One portion of the screen is provided with an opening 14 and the other portion is solid. Directly opposite the heading B and behind the screen 13, I support any suitable light 15. This may be a gas jet, an electric light or a lamp, and I have shown it as supported on a post 16. When the lever 3 is depressed this screen will be shifted longitudinally in a direction toward the lever 3, and hence the opening 14 will register with the light, and permit the light to be seen up the heading B. When, however, the lever 4 is actuated, the reverse takes place and the screen is shifted to conceal the light.

In order to prevent too great a throw of the levers 3 and 4, I provide stop pins 17 which engage over the upper ends of the levers and not only limit their inward movement, but limit their vertical movement also. As a means of forcing the levers 3 and 4 over against the rail, I preferably provide springs 18 of any suitable construction, one end of these springs being connected to the levers 3 and 4 and the other to any suitable abutment.

The operation of that portion of my invention that I have now described is as follows: The wheels of a car moving in the direction of the arrow along the heading A will depress the lever 3, thus drawing upon the rod 11 and exposing the light to an observer in the heading B, thus warning him against sending a car out of the heading and on to the main track. The signal will remain set in this position until the car has reached the lever 4 when it will be depressed to reverse the movement of the screen 13 and obscure the light. Cars moving in the reverse direction, that is up the heading A, will not operate the levers for the reason that the car wheels will force the levers 3 and 4 outward against the force of the springs 18, the rims of the wheels contacting with the inner faces of the levers. One of the difficulties, however, of the construction above described is that it might be that a car moving in the direction of the arrow might arrive upon the lever 3 at the same time that another car moving in a like direction would arrive upon the lever 4, and as a consequence the rod 11 would be subjected to strain and the bell cranks might be broken. For this reason I form the bell crank 8 in a peculiar manner. It consists preferably of two arms 19 and 20 which are pivoted upon a common axis 21. These arms are connected at their extremities by a spring 22 which tends to hold the arms in their proper rectangular relation. Attached to each of the arms 19

and 20 adjacent to their inner ends are the blocks 23 which will abut against each other when any force is exerted which would tend to press the arms together, thus the spring 22 resists an expansion of the arms beyond a right angle and the blocks 23 prevent the arms being pushed together. Thus under normal circumstances a depression of the arm 20 will through the spring 22 draw over the arm 19 which will draw upon the rod 11. A reverse movement of the rod 11 will be transmitted to the arm 19 and block 23 and to the other block 23 and the arm 20. It will be seen that these blocks 23 act as stops whereby the arms are prevented from moving inward toward each other, and hence I do not wish to be limited to the use of the blocks 23, but any form of stop preventing the approach of the arms to each other is within the spirit of my invention. With this construction it will be seen that no damage will occur to the mechanism even though two cars are upon the levers 3 and 4 at the same time, as in that case the spring 22 will yield and the arm 20 will move downward. The bell crank 9 is solid, or in other words, the two arms of the bell crank are rigidly connected to each other, it being sufficient if one of the bell cranks is yielding, as described, or some yielding connection could be placed between the rod 11 and one of the bell crank levers to accomplish the same end, although I prefer the construction hereafter specified.

It will be seen that my device is very simple and that it is particularly adapted for coal mines or other underground locations where a lamp is used as a signal means, and where one passage or heading communicates with another at an angle to the second. My mechanism is positive in its operation, and as the temperature is practically constant in mines there will be no danger of expansion or contraction of the metal. Preferably the bell cranks, rods, etc. are made of tubing, though I do not wish to limit myself to this.

Having thus described the invention what I claim as new is:

1. A junction signal for tracks comprising opposed bell crank levers, opposed track levers arranged adjacent to one rail of a track and adapted to be operated by the wheels of a car passing thereover, the free ends of said track levers being connected to said bell crank levers, a rod connecting the opposed bell crank levers and shiftable therewith, a light mounted to one side of said rod at the point of junction of the tracks, and a screen carried by said rod, this screen in one position of the rod concealing the light and in the other position permitting the light to be seen.

2. A junction signal for tracks comprising opposed bell crank levers, a rod connecting

the bell crank levers, a screen carried by the rod and having an opening therethrough, a light mounted behind the screen and adapted to show through said opening when the screen is shifted, and track levers pivoted at one end to the track bed and at the other end having a pivotal laterally shiftable engagement with the ends of the bell cranks, said track levers being shiftable by the passage of a car wheel in one direction but depressible by the passage of a car wheel in the other direction.

3. A junction signal for tracks comprising opposed bell crank levers, a longitudinal rod connecting the bell crank levers, a screen carried by the rod having an opening, a light supported behind said screen to show through said opening when the rod and screen are shifted to one position, a track lever connected to one of said bell cranks and adapted to be depressed by a car wheel passing over said lever to withdraw the screen and permit the light to be observed, and means on the other bell crank lever for returning the screen to its obscuring position.

4. A junction signal for tracks including opposed bell crank levers, a longitudinal rod connecting the bell crank levers, a screen carried thereby and having an opening, a light located behind this screen and observable through said opening when the screen is moved to one position, a track lever having its free end connected to one of said bell crank levers and mounted adjacent to the track to be operated by the wheels of a car passing in one direction to shift the screen to its open position, and a track lever mounted adjacent to the other bell crank lever and associated with the track, whereby on the passage of said car past the same, the wheels thereof shall operate the last named track lever to return the screen to its closed position.

5. In a junction signal for tracks, opposed bell crank levers, a longitudinally extending rod connecting the bell crank levers, a screen carried by the rod and having an

opening therethrough, a light mounted behind the screen and adapted to be obscured when the screen is in one position, opposed track levers extending in the same direction and associated with each of the bell crank levers, said track levers having beveled upper faces and mounted for engagement in a horizontal and vertical plane, and springs forcing the track levers into contact with the track.

6. A junction signal for tracks comprising opposed bell crank levers, a rod connecting the bell crank levers, a screen carried by the rod and having an opening therethrough, a light mounted behind the screen and adapted to be obscured when the screen is in one position, track levers extending in the same direction, the free ends of said levers contacting with the track rails and having beveled upper faces, said levers being mounted for vertical and horizontal movement, a connection between said levers and the bell crank levers whereby a vertical movement of the former shall cause a vertical movement of the latter, and a yielding resilient member located between the lower arms of the opposed bell cranks and adapted to permit a movement of the bell cranks in opposite directions to each other at the same time.

7. A junction signal for tracks comprising opposed bell cranks, a connecting rod, a signal actuated by the connecting rod, track levers engageable by the wheels of a car and operating said bell cranks to move them in opposite directions, the arms of one of said bell cranks having pivotal engagement with a common axis, the free ends of the arms being connected by a retractile spring to permit the arms to yield in a direction away from each other, and stops engaging with each arm when the arms move toward each other.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM KLEMAN. [L.s.]

Witnesses:

PETER ODEN THAL,
HARRY IMAY.