To all whom it may concern:

Be it known that I, Zack Grass, a citizen of the United States, residing at Heiner, in the county of Perry and State of Kentucky, have invented new and useful Improvements in End-Gate Raisers for Mine Cars, of which the following is a specification.

This invention relates to dumping devices used particularly in coal mines, and has for its object the provision of automatically operated means whereby the end gate of a mine car will be raised when the mine car reaches the dump whereby to eliminate the necessity of manual manipulation with its attendant dangers and inconveniences.

An important and more specific object is the provision of a device of this character which includes a movable member which is moved into an elevated position as the mine car approaches the dump and which is swung downwardly by spring pressure into engagement with a projecting arm carried by the end gate of the mine car whereby to raise the end gate, movement of this operating member being effected by a trip rail engaged by the car.

A further object is the provision of a device of this character which will be simple and inexpensive in manufacture, highly efficient in use, positive in operation, durable in service, and a general improvement in the art.

With the above and other objects and advantages in view the invention consists in the details of construction to be hereinafter more fully described and claimed and illustrated in the accompanying drawings in which—

Figure 1 is a side elevation of my device installed, the movable member being shown in its lowered position engaging the projection on the end gate and holding the latter raised.

Figure 2 is a similar view showing the movable member elevated.

Figure 3 is a cross sectional view through the trackway, showing my device in end elevation, and

Figure 4 is a detail view illustrating a slight modification.

Referring more particularly to the drawings, the letter A designates the track rails approaching the dump B which in the present instance is shown as the Philips dump though as will be hereinafter explained, the device is equally well adapted for use upon dumps of different types. The track rails carry the usual spring-pressed buffer or stop member C engageable by the wheels D of the car E at the dump. The car E carries the usual pivoted end gate F which, in the present instance, is shown as provided centrally with an upstanding bar 10 which projects above its upper edge.

Secured by any suitable means within the mine is a superstructure 11 which may be supported from the shaft by any desired means and this superstructure includes longitudinal bars 12, depending side bars 13, and a cross bar 14 connecting the lower ends of the side bars 13. Secured between the lower ends of the bars 13 is a shaft 15 which may in actual practice be a length of heavy pipe and pivoted upon this shaft is a movable plate member 16 which, when swung downwardly, is adapted to engage the upper end of the bar 10 carried by the end gate. Secured upon the shaft 15 is an arm 17 with which is connected one end of a coil spring 18 which has its other end connected with a bar 19 secured to and projecting from one of the side bars 13.

The means for moving the plate 16 comprises a trip rail 20 carried by links 21 and 22 and pivoted with respect to the rails A. The lower end of the link 22 has connected therewith a chain 28 which leads to and operates the dump in the usual manner, the detail of the function of this chain not being illustrated as forming no part of the present invention. Connected with the lower end of the link 21 is a cable 24 which extends beneath the track rail A and which is guided in its movement by suitable rollers 25. Secured upon one longitudinal superstructure bar 12 is a pulley 26 about which the cable 24 is trained, the cable leading from this pulley to another pulley 27 mounted on the superstructure and extending thence to the end of the lever arm 17.

Under ordinary conditions or when the device is not in operation, the parts are arranged as shown in Figure 1, that is the trip rail 20 is in the position shown and the plate 16 is held in vertical position by the spring 18. When the car E travels along the track A the forward wheels thereof will engage and depress the trip rail 20 whereupon the links 21 and 22 will be swung rearwardly.
This movement of the link 21 results in pulling upon the cable 24 which will result in upward swinging movement of the plate 16. As the car is traveling it will pass over and disengage the trip rail 20 whereupon the spring 18 will pull upon the lever arm 17 and swing the plate 16 downwardly with considerable force. By the time the plate 16 reaches its downward or vertical position the car E will be in such position that the plate 16 will strike against the bar 10 carried by the end gate F and result in swinging the end gate to open position so that the contents of the car will be dumped. Owing to the provision of the spring 18, the parts will automatically reset themselves. At the point where the cable 24 passes from the floor to the shaft, it is advisable to provide a pipe 28 to serve as a housing for the cable.

In some types of cross-over dumps unprovided with a trip rail it is necessary to provide a trip operated structure which I have shown in Figure 4 as comprising a crank shaft 29 journaled beneath the trackway and provided with an arm 30 extending in the path of travel of the car and an arm 31 to which the cable 24 is attached. The operation of this form is exactly the same as the other.

From the foregoing description and a study of the drawings it will be apparent that I have thus provided an extremely simple and yet highly efficient means which is automatically operable upon the approach of a car toward a dump to open the end gate of the car without any necessity for manual manipulation.

While I have shown and described the preferred embodiment of my invention it is of course to be understood that I reserve the right to make such changes in the form, construction, and arrangement of parts as will not depart from the spirit of the invention or the scope of the subjoined claims.

Having thus described my invention, I claim:
1. In combination with the trackway at a mine dump and in combination with a mine car adapted to travel upon said trackway and having a pivoted end gate, means for automatically raising said end gate when the car reaches the dump comprising an elevated superstructure, a movable member pivoted upon said superstructure and normally maintained in downwardly extending position, a trip rail engageable by the wheels of the car, a flexible member connected with said trip rail and with said movable member whereby to elevate said member upon the approach of a car to the dump, and a projection carried by the end gate of the car and engageable by said movable member upon its return to normal position when said trip rail is released whereby said movable member will strike said projection and raise the end gate.

2. A device of the character described comprising a superstructure disposed upon a trackway, a car adapted to travel upon said trackway and having a pivoted end gate, a trip rail disposed within said trackway and having a pivoted lever connected therewith, a transverse shaft carried by said superstructure, a plate secured upon said shaft and movable therewith, a lever arm on said shaft, a spring connected at one end with said superstructure, and at its other end with said lever arm whereby to hold said plate normally in a downwardly extending direction, and a flexible member connected with said link and said lever arm whereby upon passage of the car over said trip rail said shaft will be locked to elevate said plate and subsequently returned to normal position by said spring, the end gate of the car carrying a projection engaged by said plate upon the downward movement of the latter.

ZACK GRASS.