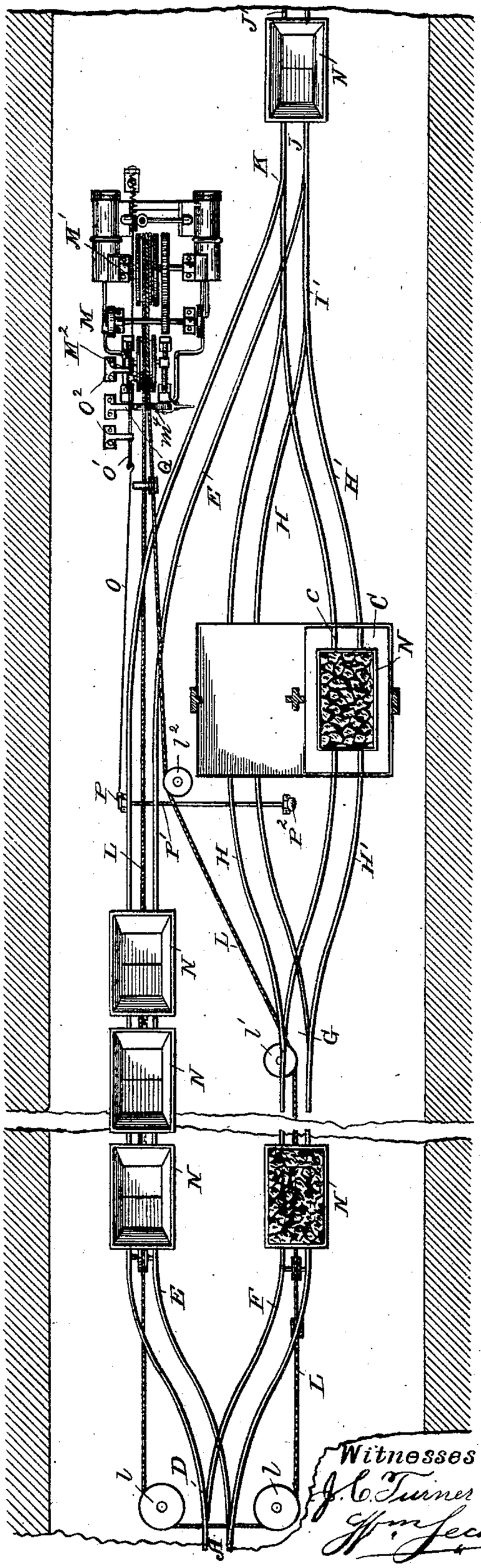
(No Model.) 2 Sheets—Sheet 1.

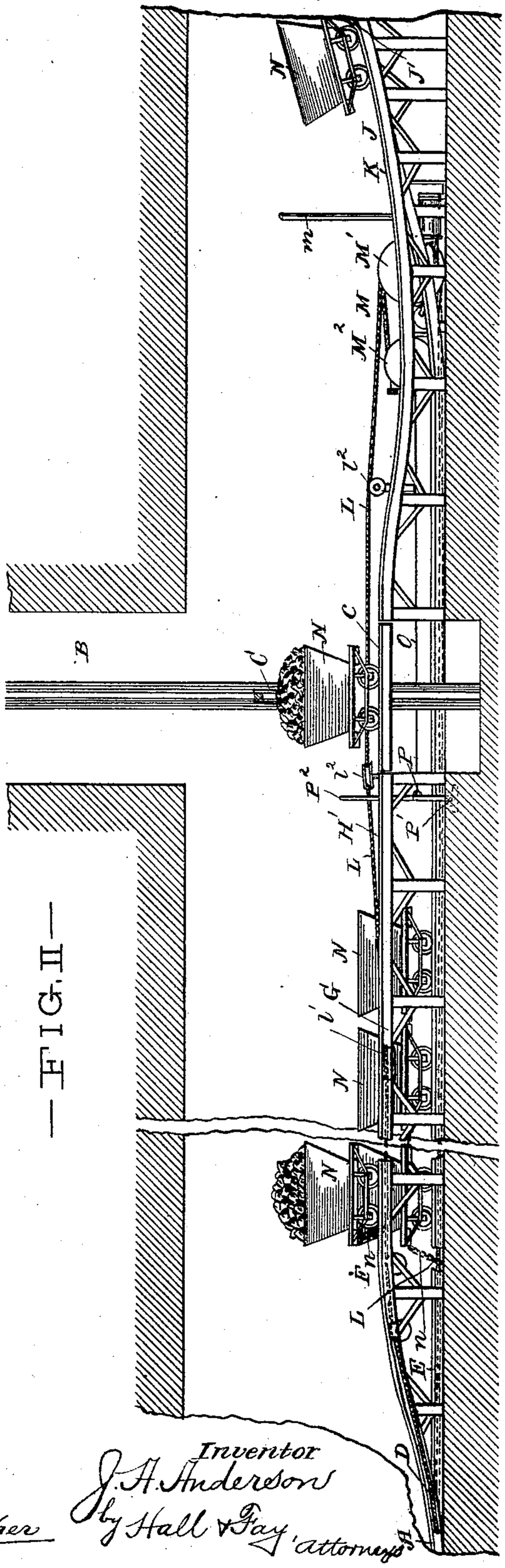
J. A. ANDERSON.

HANDLING COAL CARS IN MINES.

No. 500,547. Patented July 4, 1893.



—FIG. I—



—FIG. II—

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(No Model.)

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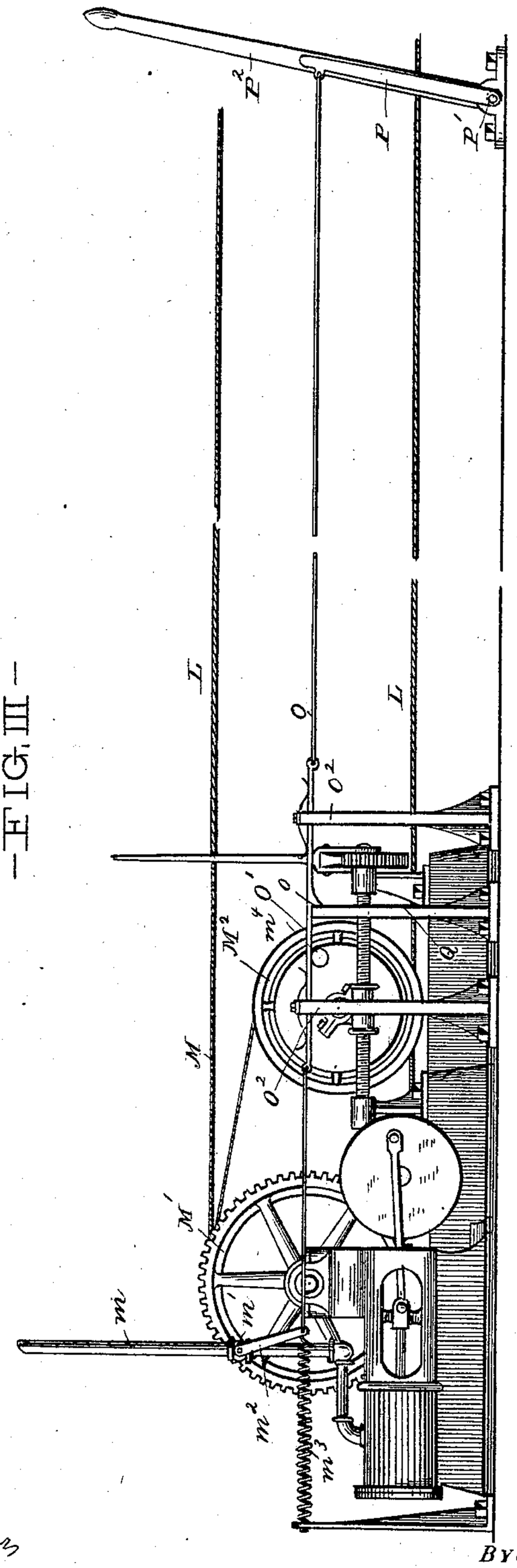
FIG. III.



WITNESSES:

J. C. Turner

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INVENTOR.

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UNITED STATES PATENT OFFICE.

JAMES A. ANDERSON, OF BEDFORD, OHIO.

HANDLING COAL-CARS IN MINES.

SPECIFICATION forming part of Letters Patent No. 500,547, dated July 4, 1893.

Application filed November 2, 1892. Serial No. 450,754. (No model.)

To all whom it may concern:

Be it known that I, JAMES A. ANDERSON, a citizen of the United States, and a resident of Bedford, county of Cuyahoga, and State of Ohio, have invented certain new and useful Improvements in Apparatus for Handling Coal-Cars in a Mine or Similar Place, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

The annexed drawings and the following description set forth in detail, one mechanical form embodying the invention; such detail construction being but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings—Figure I represents a plan view of that portion of the mine which is at the foot of the shaft, illustrating my improved apparatus for handling the coal cars of the mine; Fig. II, a vertical section of said portion of the mine, showing my apparatus in side elevation, and Fig. III, a side elevation of the engine which operates the apparatus.

A main track, A, leads into the heading or working part of the mine; and the loaded and empty cars travel in trains, forward and back, upon said track,—being propelled by the usual tail-rope system, or any other suitable or preferred system of hauling. About four or five hundred feet from the shaft, B,—in which the cages, C, alternately travel up and down,—the main track A is provided with a switch, D, opening into two sidings, E and F. One, E, of said sidings will hereinafter be called the empty siding, as the empty cars are collected upon the same; and the other siding, F, will be called the loaded siding, as the loaded cars travel upon said siding. The switch D is preferably always open from the main track to the loaded siding, and from the empty siding to the main track; so that, when a train of loaded cars arrives at the switch, said train will be automatically switched in upon the loaded siding; and, when a train of empty cars has been made up, upon the empty siding, said train will,—when set in motion,—be automatically switched in upon the main track. The loaded siding is elevated above the empty siding. Near the bottom of the mine shaft, the loaded siding has a switch, G, from which two switch tracks, H and H′, extend, each track passing across a cage. The two cages,—which alternately ascend and descend, so as to carry a loaded car up and an empty car down,—have track sections, *c*, which form continuations of said switch tracks and complete the same. At the opposite side of the mine shaft, the switch tracks incline downward to a switch, I′, where the tracks again unite and continue in an upwardly-inclined track-portion, J, which terminates in an upwardly curved end-portion, J′, which will stop a car and give it a strong impetus for its downward return. The empty siding passes around the shaft and merges into the inclined track-portion J by means of a switch, K, which is permanently open from said inclined track-portion into the empty siding.

An endless cable, L, passes around the drum of a suitable engine, M,—which latter will be more fully described,—and is guided from said engine, along and beneath the empty siding; around two guide pulleys, *l l*, across and beneath the main track, at the switch D; along and beneath the loaded siding to the switch G, of the latter; and around a guide pulley, *l′*, back to the engine drum; passing around suitable guide pulleys l^2, which guide the cable over the empty siding. One of the cars, N, of each train, has a grip, *n*, which engages the cable; and by means of which the train may be propelled along the sidings. The rear car of the loaded train and the forward car of the empty train have their grips connected to the cable; so that the loaded train may be propelled along the siding, and have one car after the other removed from it; and the empty train may be propelled along its siding, and have empty cars coupled onto it. The engine M may be of any suitable or desired type,—direct acting or geared,—and has the usual driving drum, M′, and tightening pulley, M^2, the latter being adjustable in its relation to the driving drum in any suitable or desired manner, so as to regulate the degree of friction between the driving drum and the cable. The cable L is carried around the driving drum and the tightening pulley in the usual manner, and said tightening pulley is of such diameter that the cable will be moved one car-

length,—say, about eight feet,—on each revolution of said pulley. The steam pipe, *m*, for the engine, has a throttle valve, *m'*, which is provided with an actuating arm, m^2, by means of which said valve may be opened or closed. The arm m^2 is so connected to the valve that it will open the latter when pulled toward the mine shaft, and will close the valve when pulled in the opposite direction. A spring, m^3, serves to pull said valve-actuating arm from the direction of the mine shaft so as to close the valve. A rope, O, or other flexible connection has one end attached to the actuating arm of the throttle valve and has its other end attached to an arm, P, projecting from a rock-shaft, P', journaled near the mine shaft and provided with a hand-lever, P^2. The throttle valve may thus be opened by pulling upon the hand-lever, and will be automatically closed by the spring. The rope has a rigid catch portion, O', which is formed with a shoulder, *o*, which latter may engage and be held by a catch, Q. The rigid portion O' is guided in suitable guides, O^2, so as to have no lateral movement, and the guides are so constructed that the rigid catch-portion O' has play in a vertical plane, and may slip over the catch and drop down and engage the same. The tightening pulley M^2 of the engine has a trip, m^4, upon one side, which trip may,—once in each revolution, engage and raise the shouldered catch portion of the rope from its engagement with the catch. By this contrivance the cable-driving engine may be started by pulling upon the hand-lever and opening the throttle-valve, when the shoulder will be engaged by the catch and held by the same, while the tightening pulley makes one revolution. When said pulley has made one revolution, the catch-portion of the rope is raised by the trip upon the pulley, and is disengaged from the catch, when the spring will draw the rope and the actuating arm back, closing the throttle valve, and stopping the engine.

One man is employed to operate the apparatus, and his station is at the incoming side of the cages. When a train of loaded cars arrives at the switch of the main track, the cars are switched upon the load siding and disconnected from the tail-rope which is attached to a train of empty cars upon the empty siding, so that said cars may be hauled into the mine. The grip *n* of the rear car of the loaded train is connected to the endless cable, and the forward car of the train is uncoupled and run upon the cage which is at the bottom of the shaft, at that time. As the loaded car is run upon the cage, the empty car which comes down upon the cage, is pushed off from the same and runs down the inclined switch-track, upon the upwardly inclined track-section where it is stopped and reversed, being then automatically switched onto the empty siding. The grip of said empty car,—which car will be the forward car of the empty train being made up,—is attached to the endless cable, and the operator sets the engine in motion by means of the hand-lever. The cable, and the cars attached to it, travel one car-length, and is again stopped, bringing another loaded car forward to be switched upon the second cage, which has descended while the first cage and its loaded car, ascended, when this, next loaded car may be pushed upon the cage, pushing the newly arrived empty car off from the same; and thus the operation may be continued, the operator coupling the empty cars together, as they strike the preceding cars, and uncoupling and pushing the loaded cars upon the cages. The operator needs only to start the cable after coupling an empty car to the train, when the catch device and trip will automatically stop the cable after it has moved each train forward, one car-length. By this arrangement of tracks and switches, and by the cable mechanism and its starting and automatic stopping device, one operator is enabled to handle the loaded and empty cars at the bottom of the shaft, and a great saving in labor is thereby accomplished at a place in the mine where space is always limited and where the number of men requisite to handle the cars in the usual manner, are liable to crowd and to interfere with each other.

Other modes of applying the principle of my invention may be employed for the mode herein explained. Change may therefore be made as regards the mechanism thus disclosed, provided the principles of construction set forth respectively in the following claims are employed.

I therefore particularly point out and distinctly claim as my invention—

1. In apparatus for handling cars in a mine or similar place, the combination with a main track and elevator cages, of a siding connected to said main track and having switch tracks crossing said cages and inclined downward after crossing the latter, an upwardly inclined track-section connected to the downwardly inclined ends of said switch tracks, and a siding connected to said inclined section and to said main track, substantially as set forth.

2. In apparatus for handling cars in a mine or similar place, the combination with a main track and elevator cages, of a siding having a permanently open switch connection from said main track and divided into switch tracks crossing said cages and inclined downward after crossing the latter, an upwardly inclined track-section connected to the downwardly inclined ends of said switch tracks, and a siding passing around the cages and having permanently open switch connection from the inclined track-section and into the main track at its opposite ends, substantially as set forth.

3. In apparatus for handling cars in a mine or similar place, the combination of a siding for the loaded cars, a siding for the empty cars, a cable along said sidings, an engine driving said cable, and mechanism constructed to

automatically stop said engine at predetermined periods, substantially as set forth.

4. In apparatus for handling cars in a mine or similar place, the combination of a siding for the loaded cars, a siding for the empty cars, a cable along said sidings, an engine driving said cable, a connection to the throttle valve of said engine having a catch for holding said valve open, and a trip upon the cable-driving part of said engine engaging and releasing said catch, substantially as set forth.

5. In apparatus for handling cars in a mine or similar place, the combination of a siding for loaded cars, a siding for empty cars, a cable traveling along said sidings, an engine driving said cable, a hand-lever, a throttle valve having a spring which closes it, a flexible connection between said lever and throttle valve provided with a catch portion, a catch engaging said portion, and a trip upon a pulley of the engine engaging and releasing said catch, substantially as set forth.

6. In apparatus for handling cars in a mine or similar place, the combination of a main track, elevator cages, a siding connected to said main track and having switch-tracks crossing said cages and inclined downward after crossing the latter, an upwardly inclined track section connected to the inclined ends of the switch-track, a siding connected to said inclined section and to the main track, a cable passing along the sidings, an engine driving said cable, a hand-lever near the cages, connection between said lever and the throttle valve of the engine and provided with a catch for holding said valve open, and a trip upon the cable-driving part of the engine engaging and releasing said catch, substantially as set forth.

In testimony that I claim the foregoing to be my invention I have hereunto set my hand this 31st day of October, A. D. 1892.

JAMES A. ANDERSON.

Witnesses:

WM. SECTUR,

DAVID T. DAVIES.