No. 722,951. PATENTED MAR. 17, 1903.

C. W. DAMRON.

SINGLE CABLE MINE HAUL.

APPLICATION FILED JULY 9, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

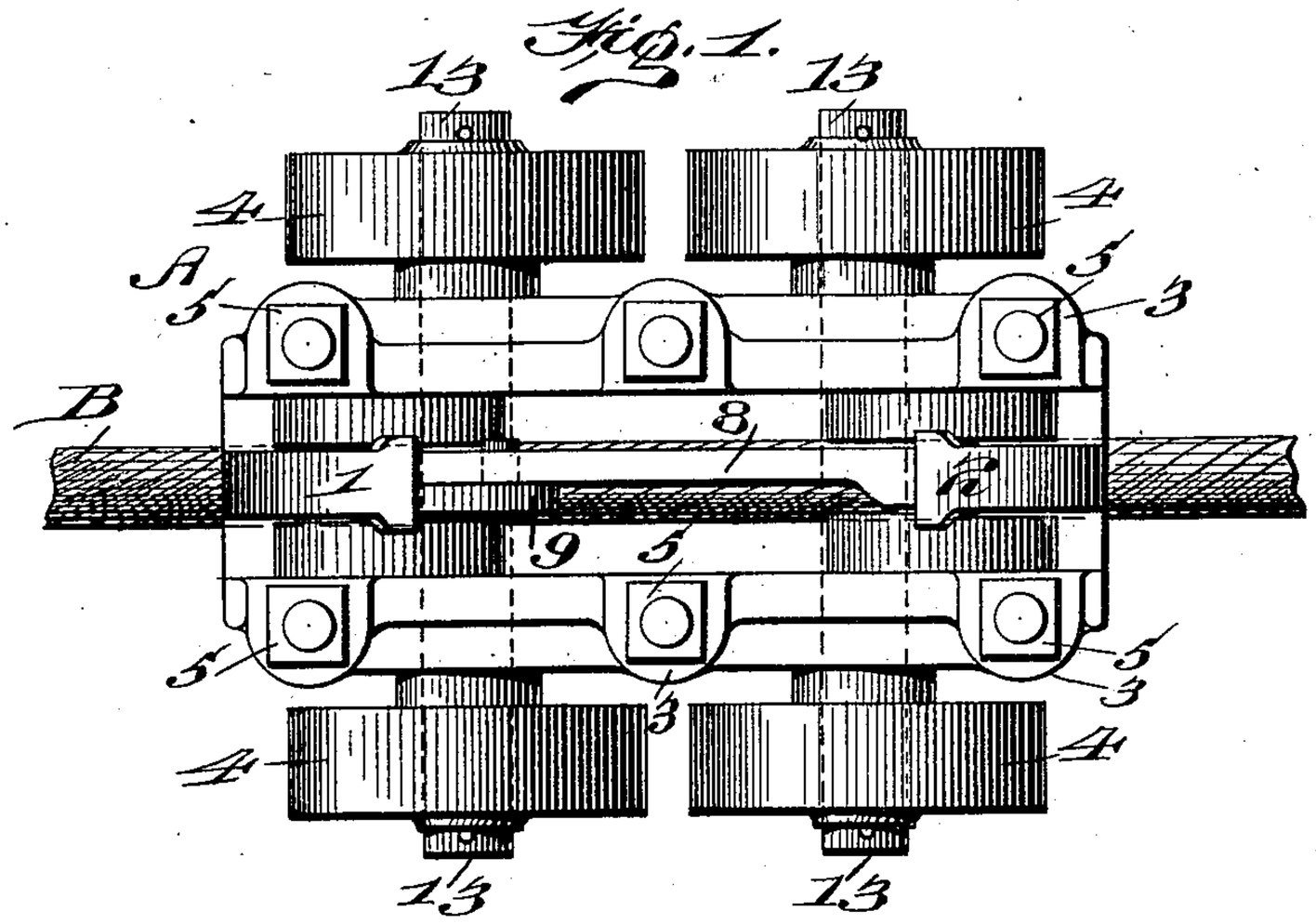

Fig. 3.

Fig. 2.

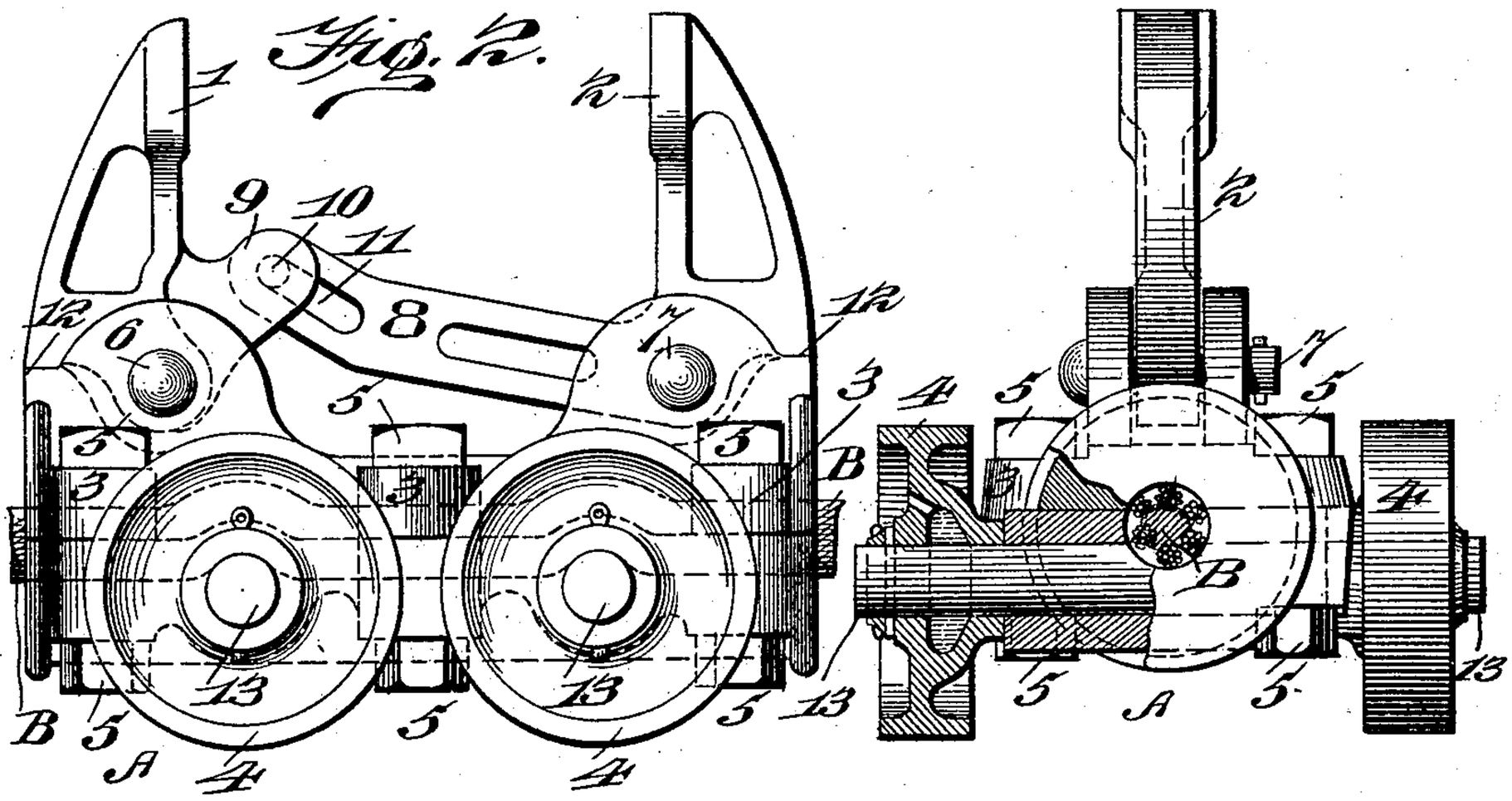

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Fig. 4.

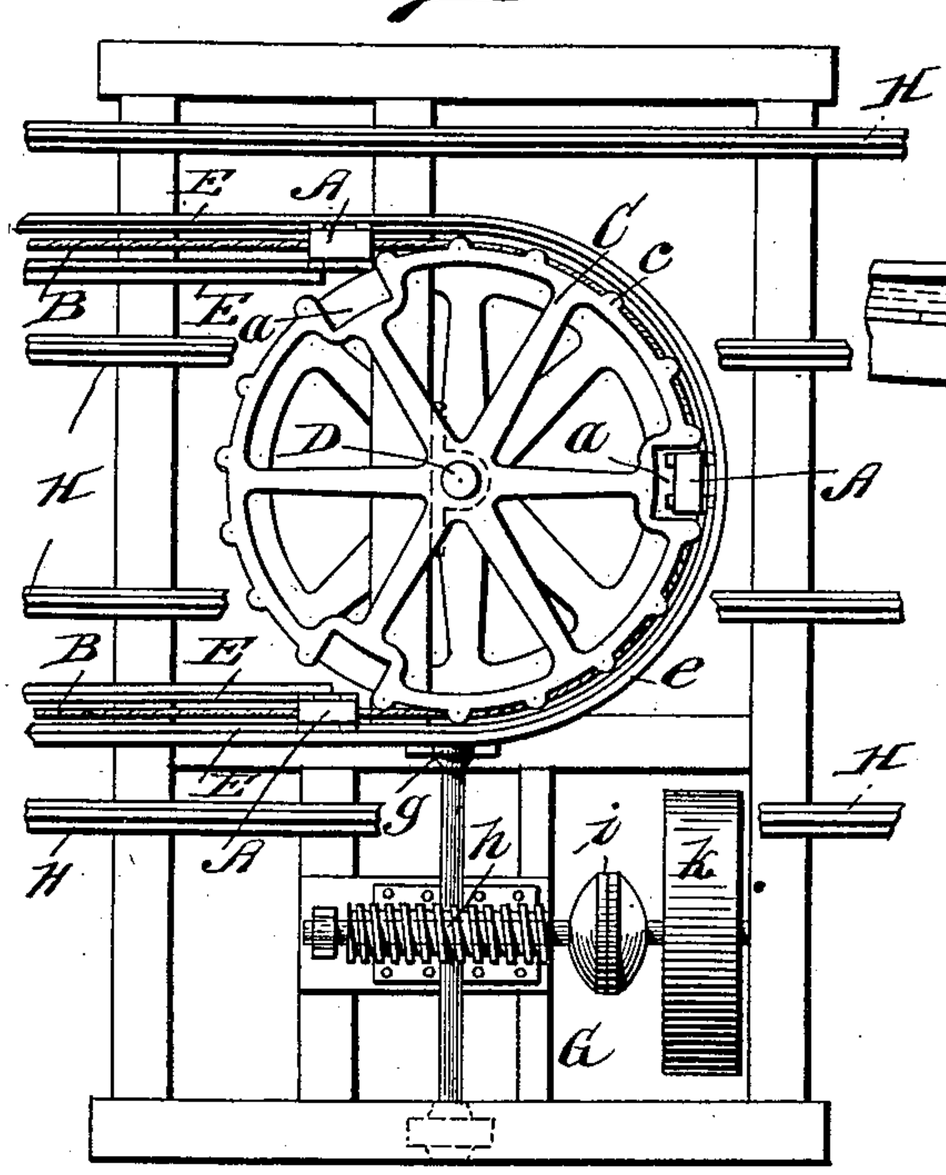


Fig. 5.

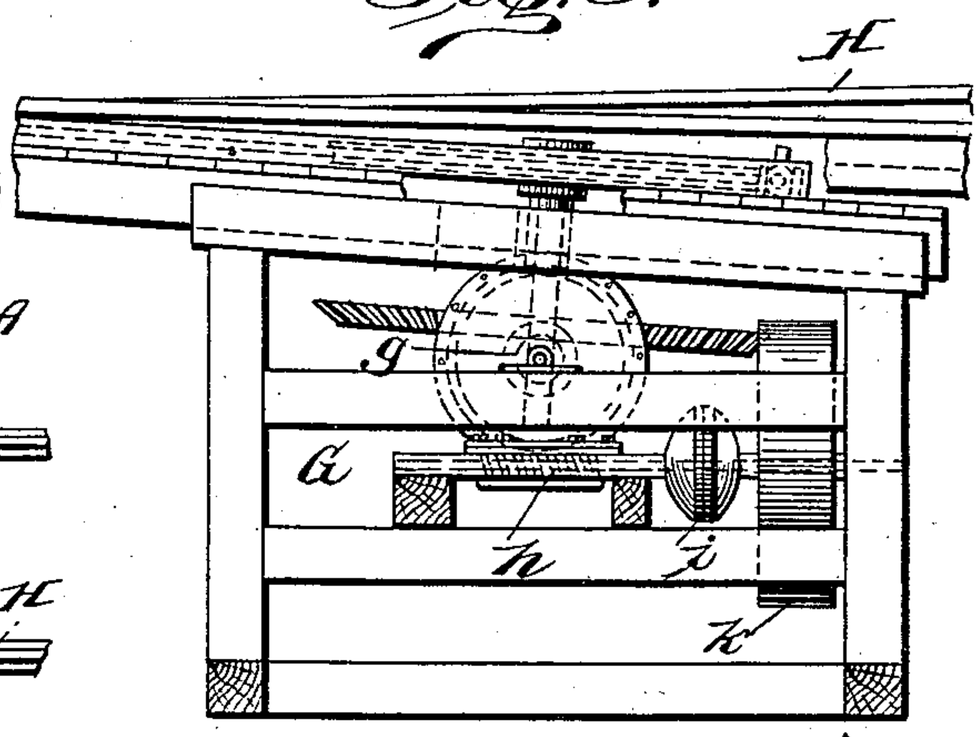
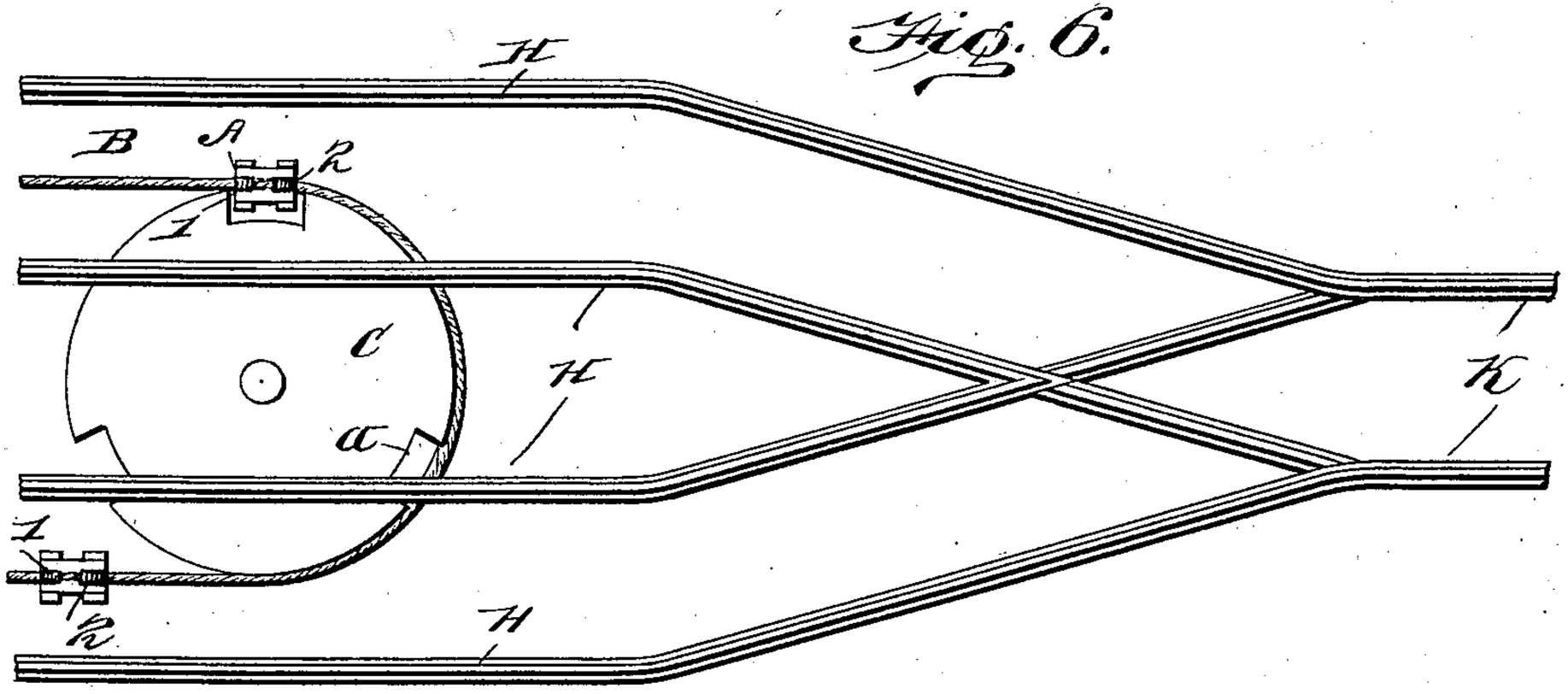


Fig. 6.



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UNITED STATES PATENT OFFICE.

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SINGLE-CABLE MINE-HAUL.

SPECIFICATION forming part of Letters Patent No. 722,951, dated March 17, 1903.

Application filed July 9, 1902. Serial No. 114,963. (No model.)

To all whom it may concern:

Be it known that I, CARSON W. DAMRON, a citizen of the United States, residing at Fairmont, in the county of Marion and State of West Virginia, have invented a certain new and useful Single-Cable Mine-Haul, of which the following is a specification.

This invention relates to cable or chain hauls by means of which mine-cars are hauled from a mine to the dump or tipple and returned to the mine.

It has for its object to simplify the construction of such hauls and to make them more efficient in use.

Cable mine-hauls as heretofore constructed have generally employed two cables—namely, one for drawing the cars from the mine to the place of discharge and the other to return the cars to the mine—and they have also usually employed a device on each car which would grip the cable or a projection thereon in order to connect the car with the cable. My invention simplifies and reduces the cost of such systems by employing a single cable operating in both directions with single equipment of cable propelling and guiding machinery and by locating means for establishing connection between the cable and the cars at suitable intervals on the cable. Inasmuch as the number of cars employed exceeds the number which can be connected with the cable, a lesser number of gripping devices is required when they are mounted at suitable intervals on the cable than when they are mounted on the car. Moreover, the location of these devices on the cable renders them more accessible for repairs, and when one refuses to act the car is not thereby disabled, so as to block the operation, but a succeeding device on the cable will pick up the car and the operation will proceed without serious interruption.

In carrying out my invention I employ a novel construction of cable-dog which operates automatically and will pick up and propel a car in either direction.

My invention will be fully understood upon reference to the accompanying drawings, in which—

Figures 1, 2, and 3 are respectively a plan, a side view, and an end view, partly in section, of the improved dog to be attached at suitable intervals upon the cable. Figs. 4 and 5 are respectively a plan and a side view of the cable-driving apparatus, and Fig. 6 is a diagram showing the relation of the cable-haul to the tracks upon which the cars run.

A represents the improved dog, which comprises a pair of arms 1 and 2 and a clamp 3, by which the arms are supported and through the medium of which they are mounted on the cable. The dog A is also preferably provided with trolley-wheels 4, which run in tracks, to be hereinafter referred to, to maintain the projection of the arms 1 and 2 in a vertical direction for engagement with the mine-car.

5 represents screw-bolts by which the members of the supporting-clamp are forced together on the cable. As shown by dotted lines in Fig. 2, the cable is deflected by these clamps upon the fixed axles of the trolley-wheels, and this affords a more complete bight to prevent slipping of the dog upon the cable.

The arms 1 and 2 are rigid as against pressure brought to bear upon their inner faces, so that when a portion of a car, such as the car-axle, or a projection on the car provided for the purpose is in between the two arms 1 and 2 the dog will be prevented from movement to any material extent relatively to the cable in either direction. In order that the portion of the car to be engaged may enter between these arms, however, the arm 1 is pivoted at 6, so as to permit it to swing inward and downward toward a horizontal position when the car is temporarily moving faster than the cable and is brought against the outer face of said arm 1. In order to restore the arm 1 to vertical position and confine the engaged portion of the car between the arms 1 and 2, the arm 2 is also pivoted, as shown at 7, and provided with a toggle-link connection with the arm 1, which toggle-link connection is formed by a long member 8, projecting from the arm 2, and a short member 9, projecting from the arm 1, and carrying a pin 10, that engages in a slot 11 of the long member 8. The proportions of these parts

and connections are such that the arm 1 may recede under impact of the portion of the car to be engaged and assume an approximately horizontal position, which movement will incline the arm 2 slightly inward, but not sufficiently to permit the portion of the car to be engaged to escape past said arm 2, and when the car impinges the arm 2 and restores it to vertical position the length of its projecting member 8 of the toggle connection will amplify the movement imparted to the arm 1 sufficiently to restore the latter to vertical position and the engaged portion of the car will be confined between the arms.

12 represents the shoulders on the arm which arrest the arms in vertical position and render them rigid against any pressure on their inner faces. A part engaged by the dog A is released by the depression of the dogs incident to deflection of the cable relatively to the part engaged, as will now appear from the description of the cable system and its driving and guiding apparatus.

B represents the cable, on which the dogs A are mounted at suitable intervals, and which cable passes around a guide-sheave C at each end of the system, one end only—namely, the driving end—being shown. The guide-sheave C is formed with peripheral lugs *c*, which confine the cable upon its periphery, and with pockets *a*, that receive the dogs A as they pass around the sheave. The shaft D of the sheave C is nearly vertical, so that the sheave C lies in an approximately horizontal plane. In this way the opposite sides of the endless cable-belt are each brought into service on one side for propelling the cars to the point of discharge and on the other side for running them to the mine. The dogs A are mounted upon the cable so that their arms 1 and 2 project vertically from the plane of the cable, and in order to hold them in this position the tracks E E are provided, which engage above and below the trolley-wheels 4 and prevent the dogs from swerving from their vertical position under any tendency which the cable might have to twist. The outer track E is continued, as shown at *e*, concentrically around the sheave C and continues to guide the dogs by their outer trolley-wheels while the dogs are traveling around the sheaves. The yielding arm 1 of each dog is at the rear end of the dog as to the direction of travel in order that the car may be moved into engagement with the dog by giving the car a temporary rate of movement exceeding the rate of travel in the cable. As will be observed from the diagram, Fig. 6, the rear yielding arm 1 is in the same relative position on the return side of the position as on the outgoing side, so that it is always in position to permit the car to move into engagement with the dog.

G represents driving connections for the cable-driving sheaves C, which driving connections may be of any desired construction—such, for instance, as a reducing bevel-gear *g*, worm-gear *h*, friction-clutch *i*, band-pulley *k*.

The car-tracks are represented at H and are merged into a common track K, leading to the dumping-point, from which the outgoing and return tracks are branched in a suitable manner. As shown in Fig. 6, the cable returns at a point in advance of the switch, its dogs being made to release the cars by the cable dropping below the plane of the track, as shown in Fig. 5, the cars being made to travel the remaining distance to the discharging-point by their momentum and then returned by gravity or by manipulation until they are again engaged with the dogs, when the cable returns them to the mine.

For convenience I have employed the word "cable" as designating the endless carrier; but I desire it to be understood that this word is intended to be considered generically as covering any other form of carrier, such as a belt, chain, or the like.

Having thus described the invention, the following is what is claimed as new therein:

1. A single-cable mine-haul, comprising an endless cable traveling around guide-sheaves, lying in substantially horizontal planes, and dogs mounted at intervals upon said cable, having arms projecting vertically from the cable and constructed to engage both in front and rear of a portion of a car, so as to confine the car relatively to the cable in both directions.

2. A single-cable mine-haul, comprising an endless cable traveling around guide-sheaves, lying in substantially horizontal planes, and dogs mounted at intervals upon said cable, having arms projecting vertically from the cable and constructed to engage both in front and rear of a portion of a car, so as to confine the car relatively to the cable in both directions; each of said dogs having two vertically-projecting arms, for thus engaging the car, one of said arms in each dog yielding to permit the car to move between the arms.

3. A single-cable mine-haul, comprising an endless cable traveling around guide-sheaves, lying in substantially horizontal planes, and dogs mounted at intervals upon said cable, having arms projecting vertically from the cable and constructed to engage both in front and rear of a portion of a car, so as to confine the car relatively to the cable in both directions; one of said dogs yielding under impact of the car against its outer face, and the yielding arm being presented rearwardly as to the direction of the cable's travel, so that the car may enter between the arms, either in traveling from or returning to the mine.

4. A single-cable mine-haul, comprising an endless cable traveling around guide-sheaves lying in substantially horizontal planes, and dogs mounted at intervals upon said cable having arms projecting vertically from the cable and constructed to engage both in front and rear of a portion of a car, so as to confine

the car relatively to the cable in both directions, and tracks formed with guide-rails between which the dogs travel to maintain their projections in vertical position.

5. A single-cable mine-haul, comprising an endless cable traveling around guide-sheaves lying in substantially horizontal planes, and dogs mounted at intervals upon said cable having arms projecting vertically from the cable and constructed to engage both in front and rear of a portion of a car, so as to confine the car relatively to the cable in both directions, and tracks formed with guide-rails between which the dogs travel to maintain their projections in vertical position; one of said guide-rails being continued concentrically around the periphery of a guide-sheave, and retaining its engagement with the dog while the latter travels around said sheave.

6. A single-cable mine-haul, comprising an endless cable traveling around guide-sheaves lying in substantially horizontal planes, and dogs mounted at intervals upon said cable having arms projecting vertically from the cable and constructed to engage both in front and rear of a portion of a car, so as to confine the car relatively to the cable in both directions, and tracks formed with guide-rails between which the dogs travel to maintain their projections in vertical position; said dogs being constructed with clamps through the medium of which they are connected to the cable, with trolley-wheels running in the tracks, and with axles for said trolley-wheels located between the clamps, and deflecting the cable to increase the bight thereon.

7. A single-cable mine-haul, comprising an endless cable traveling around guide-sheaves, lying in substantially horizontal planes, and dogs mounted at intervals upon said cable, having arms projecting vertically from the cable and constructed to engage both in front and rear of a portion of a car, so as to confine the car relatively to the cable in both directions; each of said dogs having two vertically-projecting arms, for thus engaging the car, one of said arms in each dog yielding to permit the car to move between the arms; said guide-sheaves being set below the plane of the car-track upon which the mine-cars run, and deflecting the cable so as to bring the arms of its dogs out of engagement with the cars, as the cable passes around the sheaves.

8. A dog for cable-hauls having two arms, one of which yields under impact of a part to be engaged, to admit said part between the arms, and the other of which has a limited movement and a connection between said arms, whereby the yielding of the one imparts limited movement to the other, and said other arm is returned to the normal position under impact of the part entering between the arms, and by its movement restores the yielding arm to its normal position.

9. In a cable-haul, a dog for connecting a car thereto, constructed with a pair of pivoted arms, moved by impact of the car against them, and a connection between said arms, whereby each is moved by the other.

10. In a cable-haul, a dog for connecting a car thereto, constructed with two arms mounted on independent pivots transverse to the car's movement, moved upon their pivots by impact of the car against them, and having a connection between them, whereby each is moved by the other.

11. In a cable-haul, a dog for connecting a car thereto, constructed with two arms mounted on independent pivots transverse to the car's movement, moved upon their pivots by impact of the car against them, and having a toggle connection between them whereby each is moved in an opposite direction by the other.

12. A dog for cable-hauls, constructed with a pair of pivoted arms, and a toggle connection between said arms; the member projecting from one arm being longer than that projecting from the other, whereby their movements are unequal, for the purpose set forth.

13. A dog for cable-hauls, comprising a suitable clamp for attachment to the cable, arms pivoted on said clamp, a long toggle member projecting from one of said arms, a short toggle member projecting from the other of said arms, and a slot-and-pin connection between said toggle members, for the purpose set forth.

14. A dog for cable-hauls, comprising a suitable clamp for attaching the dog to the cable, arms pivoted on said clamp, and provided with long and short toggle members having their ends connected by slot-and-pin connection, and shoulders 12 for limiting the outward movement of said arms.

The foregoing specification signed this 1st day of July, 1902.

CARSON W. DAMRON.

In presence of—
DAN. P. LYNCH,
E. F. HARTLEY.