No. 764,633. PATENTED JULY 12, 1904.

L. J. ROBB & F. W. HARRIS.

SPEED CONTROLLER FOR CAR HAULS.

APPLICATION FILED SEPT. 15, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

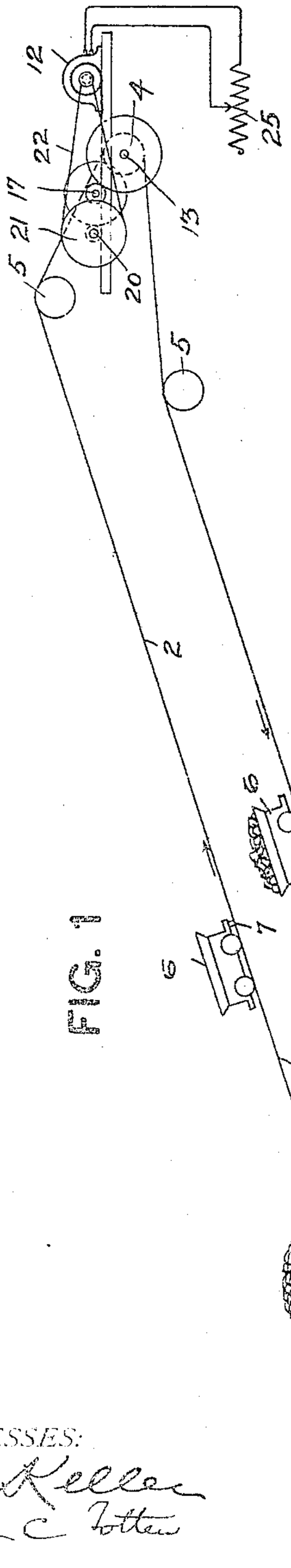

FIG. 1

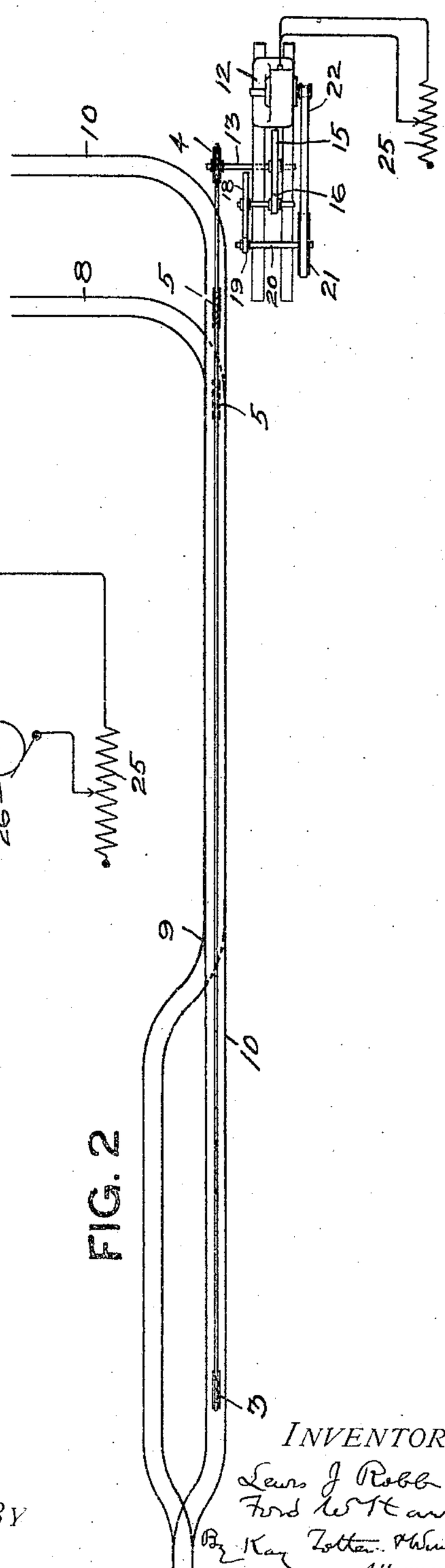

FIG. 2

FIG. 5

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FIG. 4

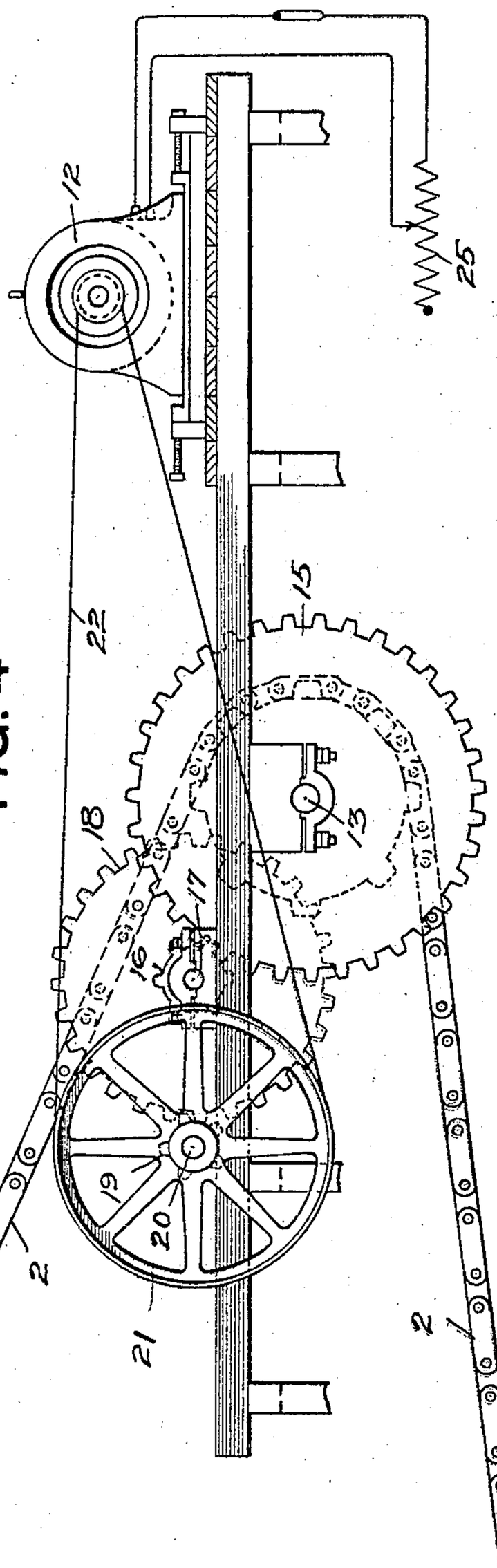
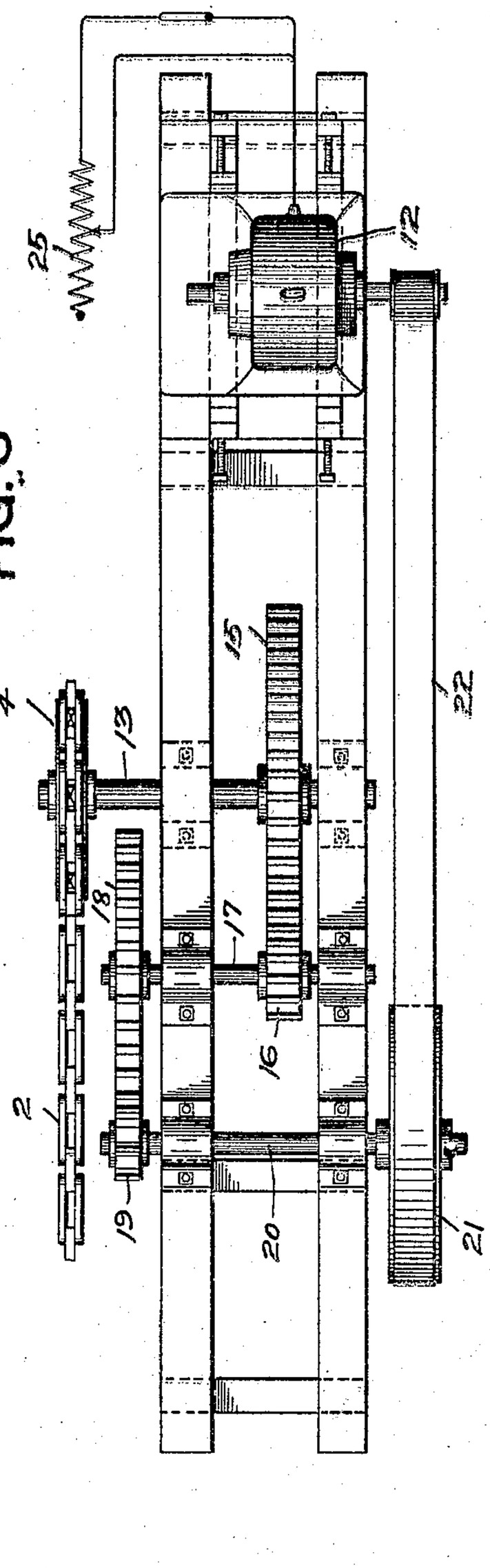


FIG. 3



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No. 764,633. Patented July 12, 1904.

UNITED STATES PATENT OFFICE.

LEWIS J. ROBB, OF PITTSBURG, AND FORD W. HARRIS, OF ALLEGHENY, PENNSYLVANIA, ASSIGNORS TO HEYL AND PATTERSON, OF PITTSBURG, PENNSYLVANIA, A COPARTNERSHIP OF PENNSYLVANIA.

SPEED-CONTROLLER FOR CAR-HAULS.

SPECIFICATION forming part of Letters Patent No. 764,633, dated July 12, 1904.

Application filed September 15, 1903. Serial No. 173,329. (No model.)

To all whom it may concern:

Be it known that we, LEWIS J. ROBB, a resident of Pittsburg, and FORD W. HARRIS, a resident of Allegheny, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Speed-Controllers for Car-Hauls; and we do hereby declare the following to be a full, clear, and exact description thereof.

Our invention relates to car-hauls, and more especially to car-hauls wherein the chain or cable which carries the empty cars up the incline is driven by the weight of the loaded cars in their descent down the incline.

The object of our invention is to provide suitable means for automatically controlling the speed of such car-hauls, so that they will move at approximately a uniform speed, and thereby deliver approximately a uniform number of cars in a given time, as well as preventing the loaded cars from gaining too much momentum in descending, and thus imparting a dangerous speed to the chain or cable.

The invention consists, generally stated, in driving an electric generator from the chain or cable and placing in the circuit of the generator a suitable resistance, so as to impose a load on the generator, and thus automatically control the speed of the chain or cable.

In the accompanying drawings, Figure 1 is a diagrammatic side view of a car-haul to which our invention is applied. Fig. 2 is a diagrammatic plan view of the same. Fig. 3 is a plan view of the speed-controlling means, the resistance being shown in diagram. Fig. 4 is a side elevation of the same, and Fig. 5 is a diagram of the preferred type of generator.

In an application filed March 20, 1903, by Alfred M. Acklin, Serial No. 148,665, is shown a car-haul wherein an endless chain is driven by the descent of the loaded cars in order to haul the empty cars up the incline. Our invention is particularly adapted to car-hauls of this character, and in the drawings we have shown it applied thereto.

As shown in Figs. 1 and 2 the chain or cable of the car-haul is shown at 2, said chain passing around the lower sprocket-wheel 3 and upper sprocket-wheel 4 and also passing over suitable guide sprocket-wheels 5, arranged in any suitable manner to give the desired incline to the chain. The cars are shown at 6, said cars being provided with the projections 7 for engaging the chain. Suitable tracks will of course be laid adjacent to the chain, the downtrack 8 branching off at 9, so as to clear the uptrack 10, the track 9 leading to the dumping-place, and the cars then running by gravity up an incline 11, which will throw them back onto the uptrack 10 a sufficient distance so that the projections 7 on the cars will engage the chain 2 and the cars be returned to the upper end of the incline. The projections 7 of the loaded cars also engage the chain, thus driving the same and furnishing the power necessary to haul the empty cars up. Our invention applies to car-hauls of this character, the object being to provide suitable speed-controlling means for the chain or cable, so as to prevent the loaded cars from gaining too great a momentum in descending, and thus imparting too high a speed to the chain, as well as to deliver approximately a uniform number of cars in a given period. Our controlling means comprises a suitable electric generator 12, which may be of any known type of generator, but which preferably is a series generator. This generator will be connected to the chain or cable 2 in any suitable manner so as to be driven thereby. In the drawings the head-shaft of the sprocket-wheel 4 is shown at 13. On this shaft is a spur-gear 15, meshing with a pinion 16 on a counter-shaft 17, and this counter-shaft also carries a spur-gear 18, meshing with a pinion 19 on a driving-shaft 20, which is provided with a pulley 21, on which runs a belt 22, leading to a suitable pulley on the generator armature-shaft. Any other suitable mechanism, however, might be used intermediate the chain 2 and generator for driving the latter. The gearing described is of course supported in a suitable frame. In order to place a sufficient load on the generator, and thus control the speed of the chain

2, said generator is connected to a suitable resistance-circuit, which may be of various forms—for instance, a power-circuit having thereon a constant load or having therein storage batteries to be charged; but for simplicity we place an ordinary resistance 25 in the generator-circuit. This resistance may be of any suitable or desirable construction, and hence has been merely shown diagrammatically. It may, if desired, be so constructed that it can be varied to suit different conditions of car-hauls, and it has been so shown, although this is not absolutely essential. This resistance is intended to remain practically constant during the working of the car-haul, so as to give a substantially constant speed to the motor.

In the operation of our system the generator will be driven from the car-haul. It is well known that a shunt or compound wound electric generator when run at low speed imposes a comparatively slight load on its driving means, whereas an increase of speed of the generator causes the load on the driving means to very sharply increase. It is upon this principle that the efficiency of our controlling means rests, for as long as the car-haul is running at the desired slow speed the generator acts only very slightly to retard such speed; but if such car-haul speeds up unnecessarily the load imposed thereon by the generator increases very perceptibly, thus rapidly acting as a retarding means for the car-haul, so that a great increase in the weight of the descending cars will produce only a slight increase in speed.

It is evident that the principle of our invention remains the same regardless of the form of generator used. In place of the series generator shown we may use an alternating-current generator connected to an inductive or ohmic resistance. Preferably, however, we use a series-wound direct-current generator connected to a circuit having a nearly constant resistance. In Fig. 5 such a system is shown, the generator-armature 26 being in series with the field 27 and both being in series with the resistance 25. This system is entirely self-regulating, and the generator-armature runs at a substantially constant speed at all times, thus giving a uniform speed to the car-haul.

Details of construction of the various devices have not been shown or described, it being apparent that various arrangements of resistance devices, generators, and driving means between the car-haul and generator may be employed.

What we claim is—

1. Means for maintaining constant speed in car-hauls comprising a traveling chain or cable, an electric generator, connections between the chain or cable and generator for driving the latter, and a circuit of constant resistance permanently connected to the generator.

2. Means for maintaining constant speed in car-hauls comprising an endless chain or cable, a wheel or the like over which the same passes, an electric generator, driving connections between said wheel and generator, and a circuit of constant resistance permanently connected to the generator.

3. Means for maintaining constant speed in car-hauls comprising an endless chain or cable traveling always in the same direction, an electric generator, connections between the chain or cable and the generator for driving the latter, and a constant-resistance device permanently in circuit with the generator.

4. Means for maintaining constant speed in car-hauls comprising an endless chain or cable, a series-wound electric generator, speed-increasing gearing connecting said chain or cable and generator for driving the latter, and a constant-resistance device permanently in circuit with the generator.

In testimony whereof we, the said Lewis J. Robb and Ford W. Harris, have hereunto set our hands.

LEWIS J. ROBB.
FORD W. HARRIS.

Witnesses:
Robert C. Totten,
G. Kremer.