Jan. 2, 1934. G. M. JOHNSON 1,942,247

CAR HANDLING APPARATUS

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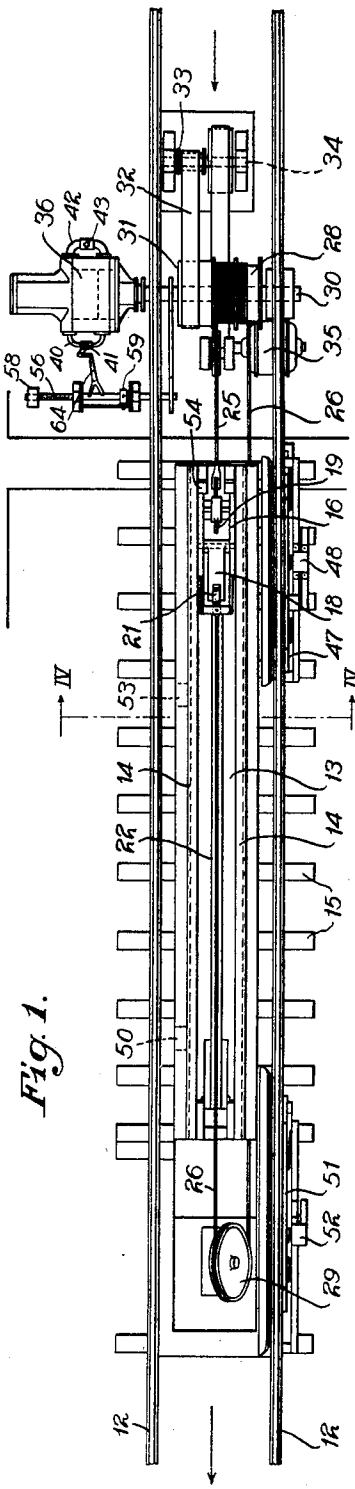


Fig. 1.

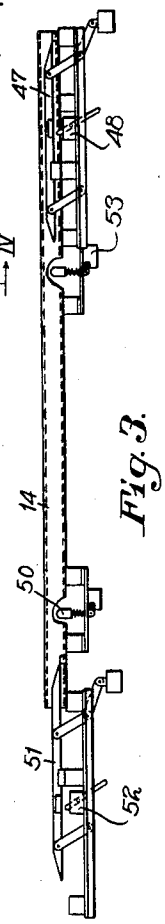


Fig. 3.

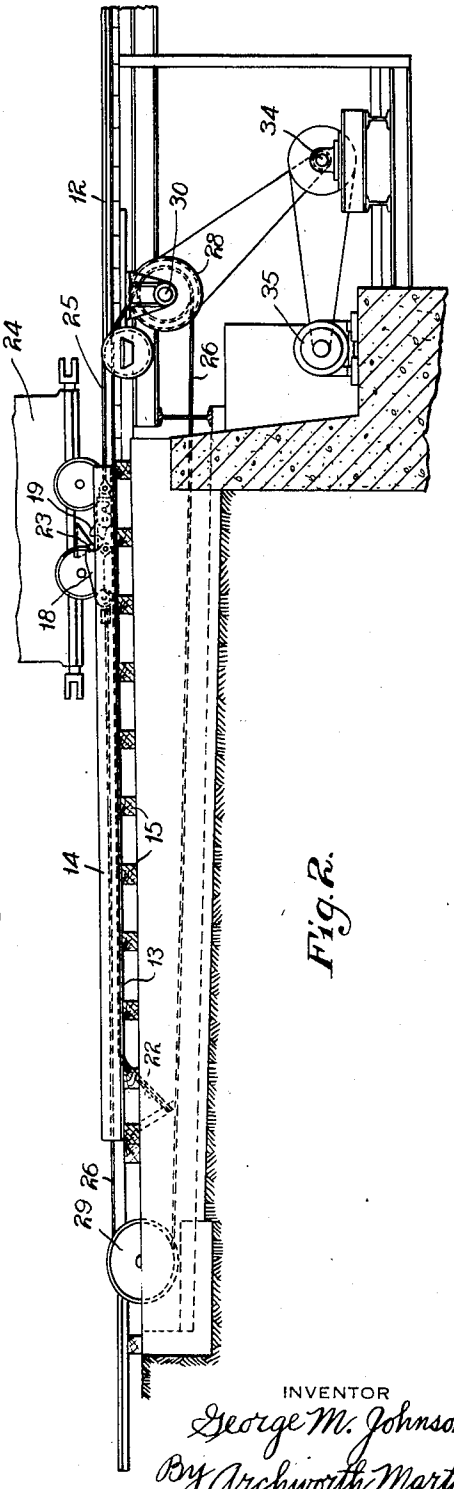


Fig. 2.

INVENTOR
George M. Johnson,
By Archworth Martin,
Attorney.

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Fig. 4.

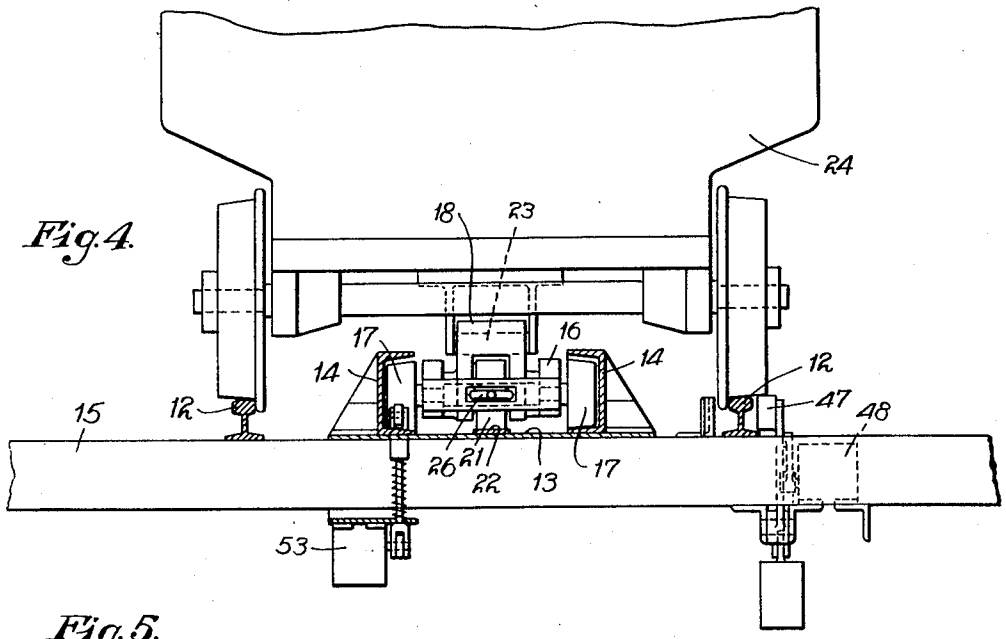
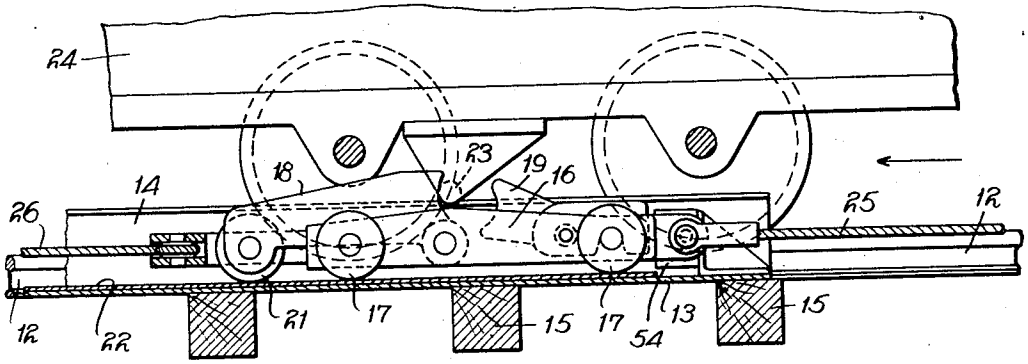



Fig. 5.



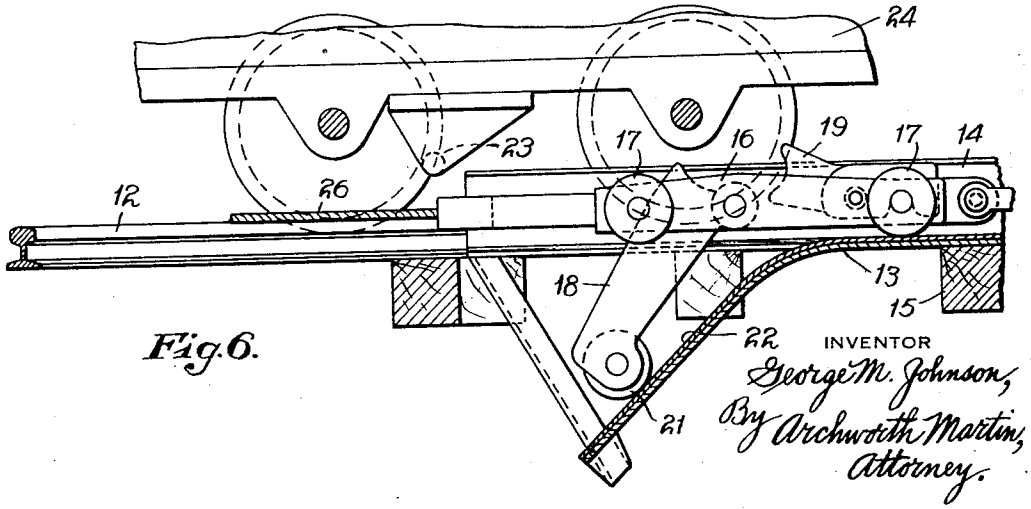




Fig. 6.

INVENTOR
George M. Johnson,
By Archwoth Martin,
Attorney.

Jan. 2, 1934. G. M. JOHNSON 1,942,247

CAR HANDLING APPARATUS

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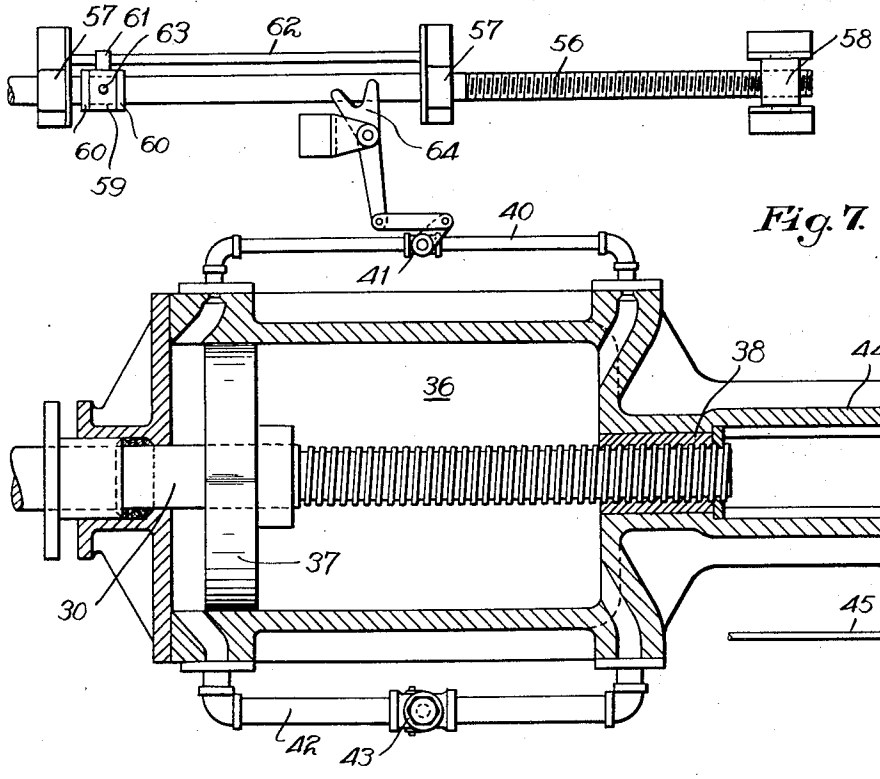



Fig. 7.

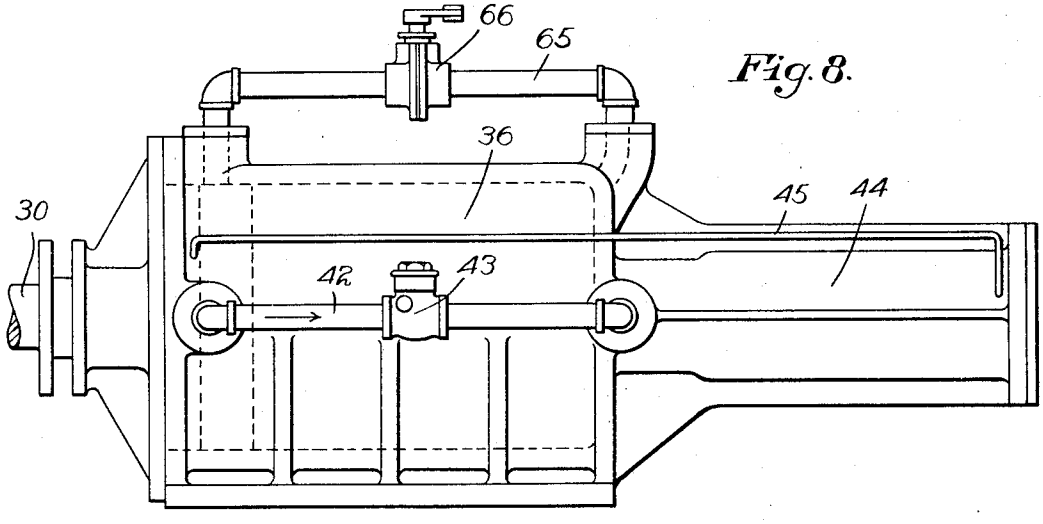



Fig. 8.

INVENTOR
George M. Johnson,
By Archworth Martin,
Attorney.

Jan. 2, 1934. G. M. JOHNSON 1,942,247

CAR HANDLING APPARATUS

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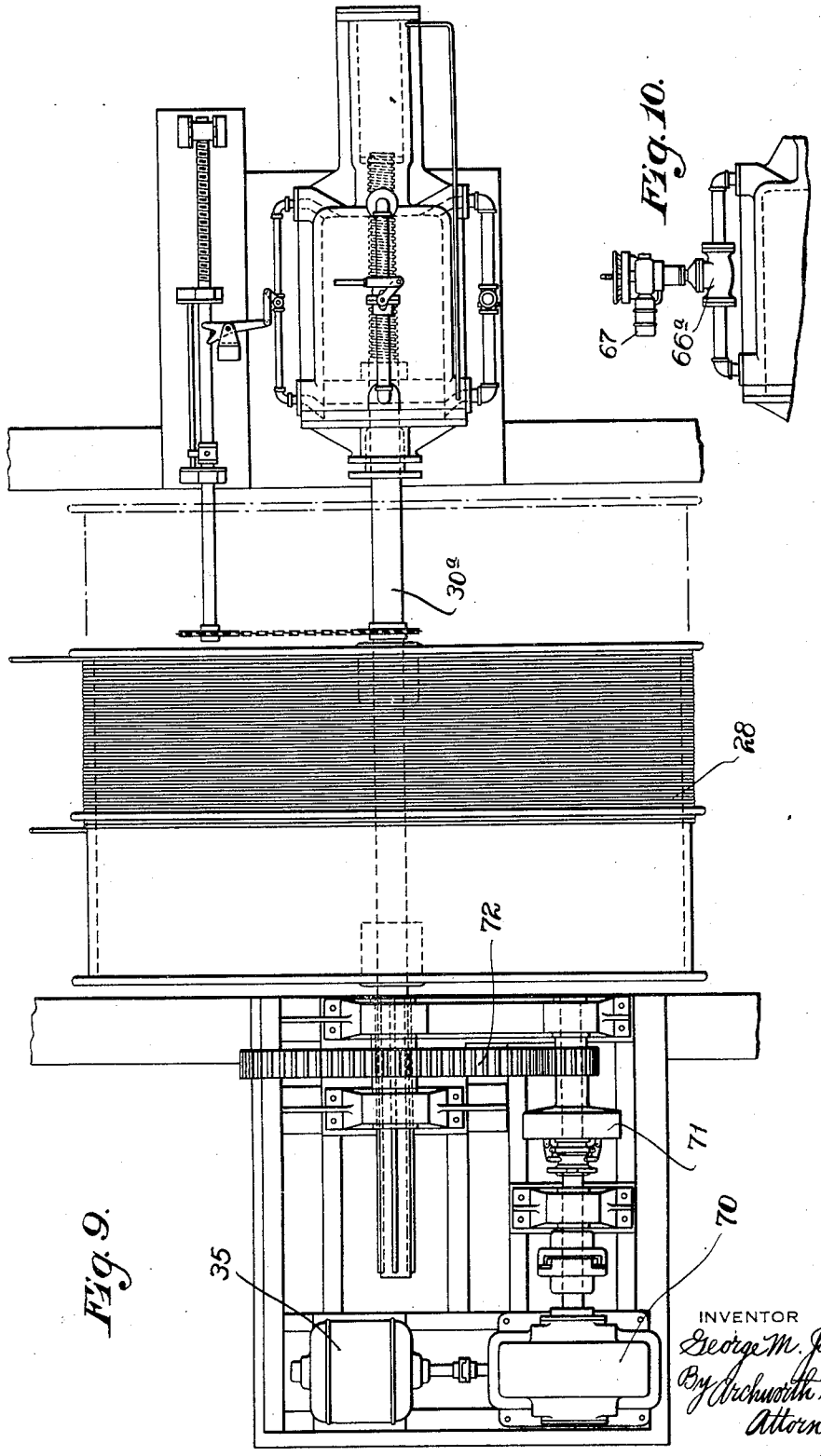



Fig. 9.




Fig. 10.

INVENTOR
George M. Johnson,
By Archworth Martin,
Attorney.

Patented Jan. 2, 1934 1,942,247

# UNITED STATES PATENT OFFICE

1,942,247

## CAR HANDLING APPARATUS

George M. Johnson, Jeannette, Pa., assignor to Fort Pitt Mine Equipment Company, Jeannette, Pa., a corporation of Pennsylvania

Application February 5, 1931. Serial No. 513,525

6 Claims. (Cl. 104—172)

My invention relates to car-handling apparatus, and more particularly to means for controlling the movements of track cars, etc.

It is frequently necessary to regulate the speed of cars such as are employed around coal mines, quarries, blast furnaces, railroad yards, etc., and my invention has for one of its objects the automatic control and regulation of car speeds within certain zones, to prevent collisions, and to limit the distance of travel thereof.

Another object of my invention is to provide an improved form of apparatus for automatically causing cars to move at a predetermined speed, either by way of reduction of the speed thereof when the cars are acted upon by the apparatus, or by increasing the speed thereof.

Another object of my invention is to provide means for controlling the rate of speed of cars moving through a predetermined zone or for automatically stopping said cars at any desired point within said zone.

Still another object of my invention is to provide an improved form of car haul apparatus.

A further object of my invention is to provide an improved form of car-engaging and disengaging mechanism for use in connection with car-handling apparatus.

Some of the forms which my invention may take are shown in the accompanying drawings wherein Figure 1 is a plan view of an installation embodying my invention; Fig. 2 is a side elevational view of the apparatus of Fig. 1, but with a portion of the apparatus of Fig. 1 omitted; Fig. 3 is a side elevational view showing another portion of the apparatus of Fig. 1; Fig. 4 is a view taken on the line IV—IV of Fig. 1; Fig. 5 is a vertical sectional view of the structure of Fig. 4; Fig. 6 is a view similar to Fig. 5, but showing the position of the members when at the discharge end of the car haul; Fig. 7 is a sectional plan view, on an enlarged scale, of the hydraulic retarding device of Fig. 1; Fig. 8 is a side elevational view thereof; Fig. 9 is a plan view showing a modification of the apparatus of Fig. 1, and Fig. 10 shows a modification of a portion of the apparatus of Fig. 8.

The apparatus is shown as employed in connection with the movement of cars along track rails 12 in the direction indicated by the arrows. In the usual practice of the invention the rails 12 will be inclined so that the cars will tend to move under the action of gravity, in the direction of the arrows, and the purpose of the herein-described invention is to regulate the rate of travel and to control the movements of cars. To this end, I provide means for accelerating the cars if they are moving at a too low speed, and for retarding the movement thereof if they are moving too fast. Also, I provide means for automatically stopping them at desired points.

Between the rails 12, I provide a framework consisting of a base plate 13 and channels 14 (shown more clearly in Fig. 4) which are mounted upon the cross ties 15 that support the rails 12.

What, for convenience, I herein term a "pony truck" is movable along the channels 14 in directions parallel to the track rails. This truck comprises a frame 16 provided with wheels 17 that are guided within the channels 14, which channels function as tracks for said wheels. Pawls or dogs 18 and 19 are pivotally supported upon the framework and normally occupy the positions shown in Fig. 5. These dogs are what are known as the knock-over type, so that a car can freely pass over at least one of the dogs in one direction, but will be automatically caught by said dog if an attempt is made to move the car in the opposite direction with respect to the pony truck. The pawl 18 carries a roller 21 which rides on a rail plate 22 that rests upon the base plate 13.

The dogs 18 and 19 are shown in position to engage a cleat 23 that is carried by the car 24 whereby an operative connection between the pony truck and the car may be effected. It will, of course, be understood that the dogs could be of such form that they would engage the car axles or even extend to a point sufficiently high to effect engagement with the bumpers or end sills of the car.

A cable end 25 is connected to the rear end of the car haul, and a cable end 26 is connected to the front end thereof. Thus when pull is exerted on the cable 26, the pawl 19 will be brought into engagement with the cleat 23 to accelerate the car, while tension on the cable end 25, with the pawl 18 in engagement with the cleat, will exercise a retardant effect on the car.

Assuming the pony truck to be in the position shown in Fig. 1, namely at the entrance end of the car haul device, the cable end 25 will be wound on a drum 28 as indicated in Fig. 1, and the cable end 26 unwound therefrom, the cable end 26 extending around a sheave 29 that is mounted at the discharge end of the car haul.

The drum 28 is secured to a shaft 30, which shaft also carries a wide faced pulley 31. A belt 32 passes around the pulley 31 and a pulley 33. The pulley 33 is mounted on a shaft 34 that is driven from an electric motor 35. The belt 32 is so tensioned that there will be some slippage

thereof when pulling strains thereon exceed a predetermined degree.

Th shaft 30 extends into a cylinder 36 and carries a piston 37 (Fig. 7). The shaft 30, at its inner end, has screw-threaded connection with a bushing 38 that is rigidly mounted in the end of the cylinder 36, so that as the shaft 30 rotates, it will be shifted longitudinally of its axis to effect travel of the piston 37 within the cylinder. Such movement of the shaft 30 is possible without disturbing the driving connection at the belt 32, because of the wide faced pulley 31.

A pipe 40 is connected to the cylinder at opposite sides of the piston 37, so that when the piston 37 moves to the right from the position shown in Fig. 7, fluid will be forced through the pipe 40 to the rear side of the piston, the rate of movement of the fluid being controlled by a valve 41. A retardant force is thereby exerted on the shaft 30 which will control the rate of rotation of the winding drum 28, whether such drum be operated simply by the pull of cars moving under the action of gravity or whether it be driven by the motor 35.

A by-pass 42 of large diameter relative to the pipe 40 is connected to the cylinder at the opposite sides of the piston 37, and is provided with a check valve 43 which opens under the pressure of fluid during retractive movement of the piston 37 to thus permit more rapid restoration of the parts to the position shown in Fig. 7. The check valve 43, is, of course, automatically closed when the piston advances.

The cylinder 36 has an extension 44 into which the end of the shaft 30 may be moved and is provided to receive liquid which may leak past the thread of the shaft, and the extension also serves as a shield for the shaft. A breathing pipe 45 affords communication between the extension 44 and the rear side of the piston to avoid development of pressure or vacuum within the extension 44. Suitable fluid, such as oil, for example, may be contained within the cylinder 36, the cylinder being incompletely filled so that a slight air cushion effect may be secured to avoid sudden shocks resulting from the incompressibility of the liquid used.

When a car 24 approaches the position shown in Fig. 2, and hence comes within the control of the car haul device, it actuates a treadle 47, which in turn operates a switch 48 that closes the circuit through the motor and sets the pony truck in motion. At this time, the cleat will enter between the dogs of the pony truck. If the car is moving slower than the desired speed, it will be engaged by the dog 19 and accelerated to a desired degree. However, the rate of movement under such acceleration is determined by the setting of the valve 41 which controls the rate of flow of the liquid from one end of the cylinder to the other, and hence the rate of rotation of the drum 28. The car will therefore be discharged from the car haul at a predetermined speed.

On the other hand, if the car is moving too rapidly, it will engage with the dog 18 and the pull by the pony truck on the cable end 25 will be resisted, because the rate at which the drum 28 can be rotated during unwinding of the cable end 25 will be controlled by the setting of the valve 41, as above-explained, and the car will therefore be discharged from the car haul at a desired predetermined rate of speed. The initial shock as between the car and the control mechanism, when the car enters the car haul, is cushioned by the compression of the small amount of air contained with the liquid in the cylinder 36, since the liquid will be cushioned by the entrapped air.

When the pony truck and a car engaged thereby reaches the discharge end of the car haul, the roller 21 of the dog 18, will roll down the inclined end of the track 22, thus tilting the upper end of the dog out of the path of the cleat 23, and permit continued travel of the car independently of the pony truck, as shown in Fig. 6. One of the wheels of the pony truck engages a switch 50 located near the discharge end of the car haul, (Fig. 2), and operation of such switch will result in breaking the circuit of the motor to discontinue the application of driving force to the pony truck.

The car as it moves from the car haul engages a treadle 51 which actuates a switch 52. The switch 52 closes the circuit which will cause operation of the motor 35 in the reverse direction, to thereby return the pony truck to the position shown in Fig. 1. As the pony truck reaches its retracted position, it actuates a switch 53 that again breaks the circuit of the motor. Bumper or stop members 54 (Fig. 5) are provided for positively limiting return movement of the pony truck.

In some cases it may be desired to automatically stop the cars at predetermined points within the zone of the car haul. To this end, I provide a shaft 56 that has driving connection with the shaft 30, as shown in Fig. 1. The shaft 56 is slidably supported in bearings 57, and has threaded connection with a rigidly-mounted nut 58, so that as the shaft 30 is rotated and moves longitudinally of itself, the shaft 56 will have similar movement.

A yoke 59 is loosely supported on the shaft 56, between flanges 60 that are connected to the shaft, so that the shaft can rotate within the yoke 59 and the yoke be carried along with the shaft during its longitudinal movements. The yoke 59 has an extension 61 that engages a rod 62 which is supported in the bearings 57 to prevent rotation of the yoke. The yoke carries a pin or stud 63 that will engage a forked lever 64 to effect closing of the valve 41 when the cable end 25 has been unwound from the drum 28 a predetermined distance, to thereby bring cars engaged by the car haul to a stop. Retractive movement of the shaft 56 will, of course, effect operation of the lever 64 to restore the valve 41 to its normal position.

The members 60 may suitably be in the form of collars that have screw-threaded connection with the shaft 56 so that they can be adjusted longitudinally thereof to change the position of the yoke 59, so that cars can be automatically brought to rest at any desired point along the car haul.

In order to permit release of cars stopped at a predetermined point as above-explained, an auxiliary by-pass 65 is provided as shown in Fig. 8. This by-pass contains a valve 66 that may be manually operated to establish communication between the opposite sides of the piston 37, so that the car can resume its travel. When the car is discharged from the car haul, the valve 66 will be again closed to permit normal automatic operation of the apparatus.

Instead of the manual control valve 66 of Fig. 8, I may provide a valve 66a (Fig. 10) that is controlled by a motor 67 whose circuit may be suitably controlled from a remote point. Automatic

stopping of the cars as above-explained may be desirable under a number of conditions. For example, cars may be stored on the tracks 12 at a point in the vicinity of the car haul, or workmen may be engaged in dumping cars at a tipple just beyond the discharge end of the car haul.

Referring now to Fig. 9, which shows a modification of the structure of Figs. 1 and 2, I show the drum 28 driven by the motor 35 through worm gearing 70, a friction clutch 71, and gear wheels 72. The gear wheels 72 have sliding connection with the shaft 30*a*, which carries the drum 28, so that such shaft may have longitudinal movement during rotation thereof as in the case of the shaft 30. The friction clutch 71 constitutes a yieldable driving connection as in the case of the belt 32 which is intended to slip under excessive strains as above set forth.

The apparatus may be employed to limit the rate of travel of cars independently of the motor and its associated driving mechanism, since the pony truck is connected by the cable end 25, through the drum 28, with the shaft 30, whose rotation is controlled by the dash pot device. Thus assuming the motor 35 to be eliminated, a car entering the system, with the pony truck in the position shown in Figs. 1 and 2, will engage the dog 18, thereby setting the drum 28 in motion. If the car approaches the pony truck at a speed say of 500 feet per minute, the setting of the valve 41 may be such that its speed will be reduced to say 200 feet per minute. The pony truck could be returned from the discharge end of the car haul by any suitable means, such as by a counter-weight applied to the rope end 26, for the purpose of revolving the drum 28 in the opposite direction to that in which it rotates through the pull exerted on the pony truck.

The by-pass 42 could, of course, be eliminated, but it affords a means for more quickly returning the parts of the mechanism to their retracted or normal positions than would be possible if the fluid had to be returned past the valve 41 and through the conduit 40 to the front side of the piston 37. While the valve 41 could be fully opened to permit a more rapid return of the fluid, the provision of the by-pass 42 avoids the necessity of repeatedly operating the valve 41 instead of permitting it to remain in a predetermined position that will insure proper control of car speeds.

I claim as my invention:—

1. Car-handling apparatus comprising a winding drum, a pony truck, a cable connecting the truck to the drum, car-engaging devices carried by the truck, guide rails for the truck, and means adjacent to the forward end of the guide rails for causing movement of one of said devices carried by the truck out of its normal forward path of travel to thereby effect disengagement thereof from a car.

2. Car-handling apparatus comprising a drum, a cable connected to said drum, a device for detachably connecting the cable to a car, a speed-controlling device operatively connected with said drum for limiting the rate of rotative movement of the drum, and means driven by said drum and automatically operable upon a predetermined number of revolutions of the drum while the car is connected to said cable, to actuate said speed-controlling device for preventing further movement of said drum.

3. Car-handling apparatus comprising a drum, a cable connected to said drum, a device for detachably connecting the cable to a car, a speed-controlling device operatively connected with said drum for limiting the rate of rotative movement of the drum, means driven by said drum and automatically operable upon a predetermined number of revolutions of the drum while the car is connected to said cable, to actuate said speed-controlling device for preventing further movement of said drum, and manually-operable means for releasing said speed-controlling device and thereafter permitting further movement of the drum.

4. Car-handling apparatus comprising a pony truck, guide rail for the truck, opposed car-engaging devices carried by the truck, one of said devices being adapted to be depressed through engagement with a member carried by a car to cause entry of the member between said opposed devices, and means adjacent to the forward end of the guide rails for causing movement of the other of said devices out of its normal forward path of travel, to thereby effect disengagement thereof from the member carried by the car.

5. In a car speed regulator, the combination with a pony truck and means for moving the same forwardly at a predetermined rate of travel, of a pair of car-engaging devices pivotally carried by said truck in opposed relation, one of said devices being arranged to be depressed through engagement with a member carried by a car to cause entry of the member between said devices, and means for supporting the other of said devices against rocking movement during movement of said truck, said supporting means terminating at a point adjacent to the end of the forward movement of said truck, thereby to permit rocking movement of said other device out of the path of movement of the member carried by the car.

6. In a car speed regulator, the combination with a pony truck and means for moving the same forwardly at a predetermined rate of travel, of a pair of car-engaging devices pivotally carried by said truck in opposed relation, one of said devices being arranged to be depressed through engagement with a member carried by the car to cause entry of the member between said devices, the other of said devices having a forwardly extending portion, and a rail co-extensive with the length of travel of said truck, and engaged by said extended portion to support the said other device against rocking movement during movement of said truck, the forward end of said rail being downwardly inclined to permit rocking movement of said other device out of the path of movement of the member carried by the car.

GEORGE M. JOHNSON.