

Aug. 1, 1961

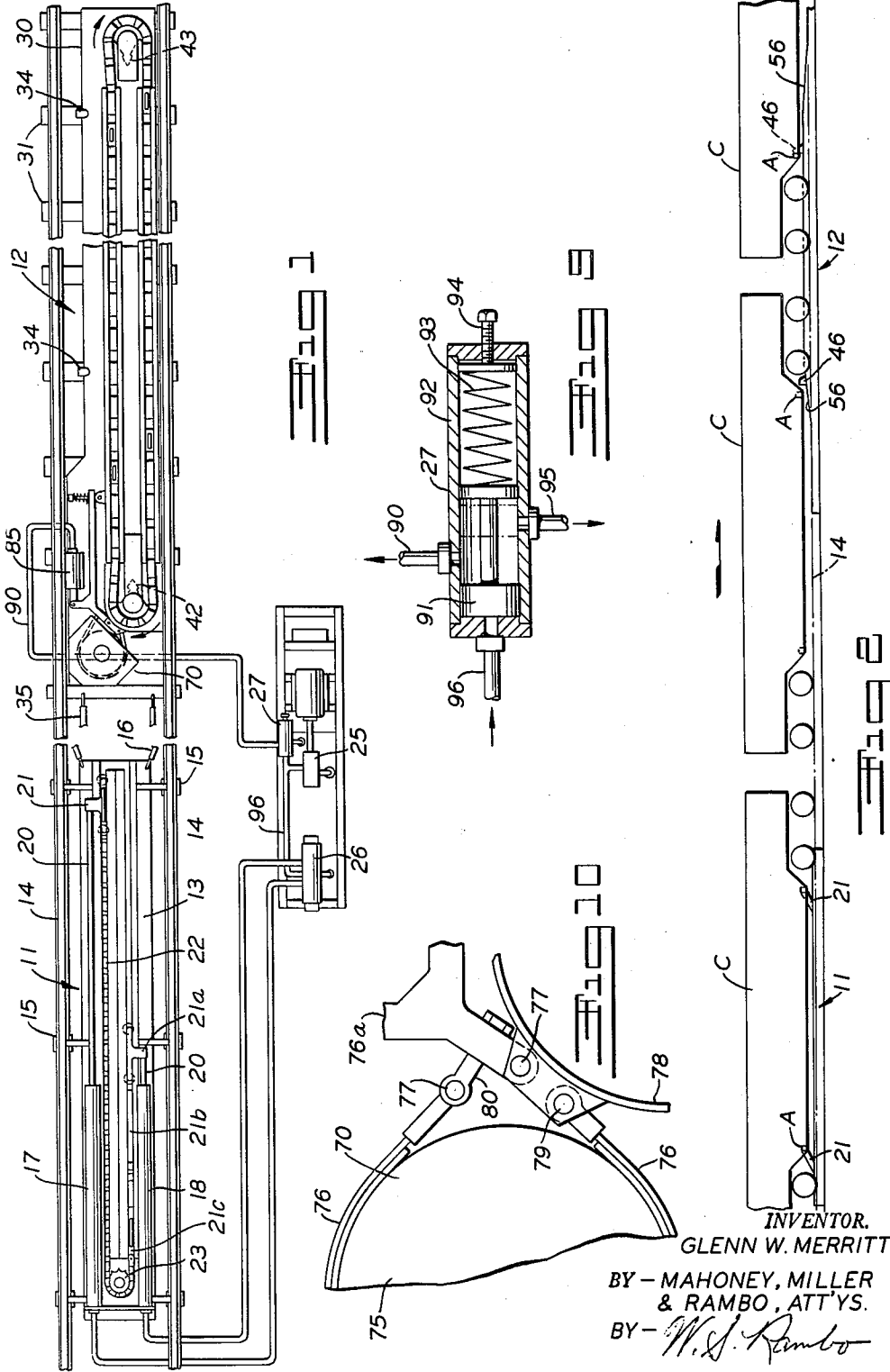
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2,994,283

CAR-RETARDING AND HOLDING MECHANISM

Filed May 27, 1959

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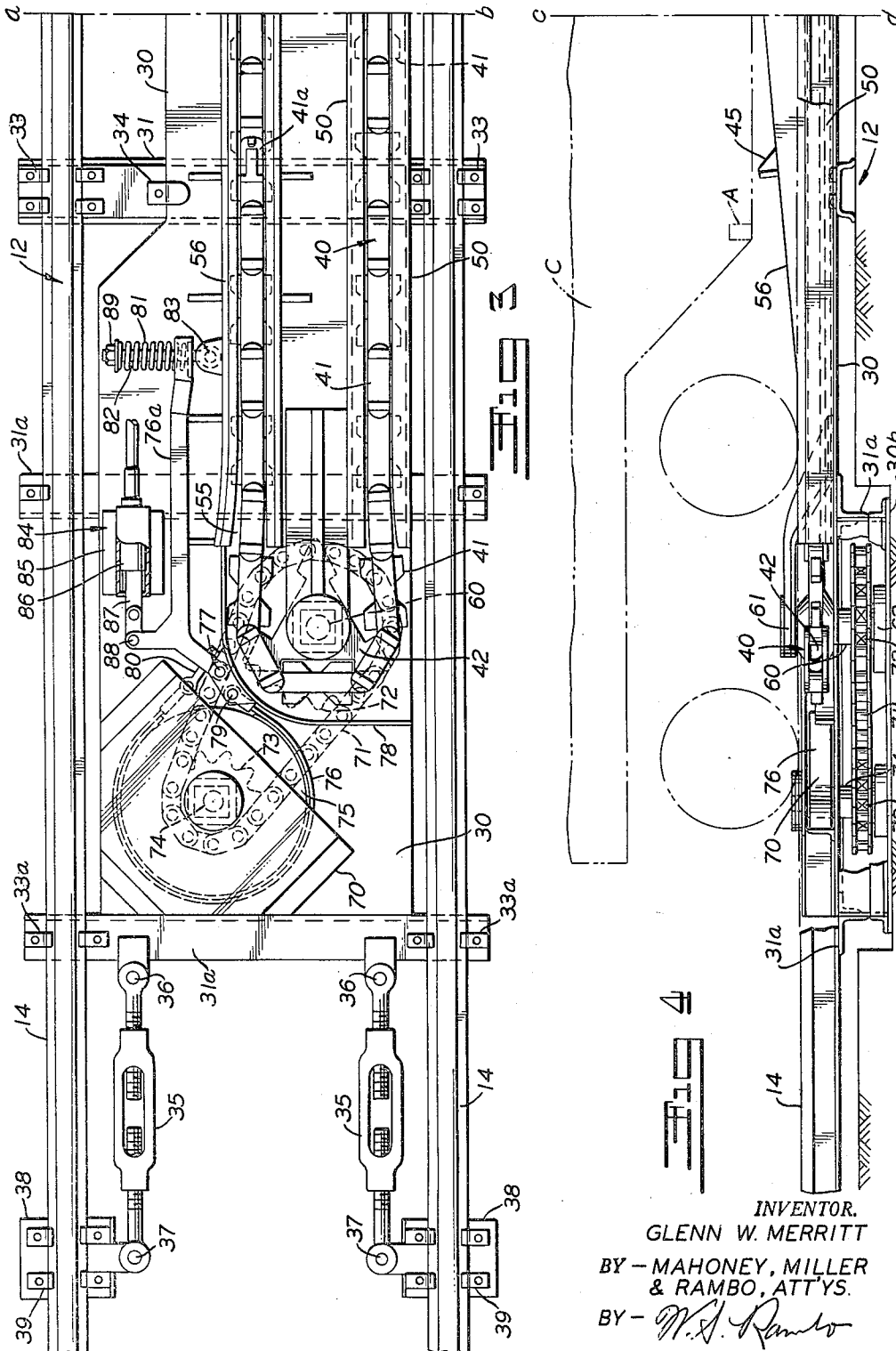
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CAR-RETARDING AND HOLDING MECHANISM.

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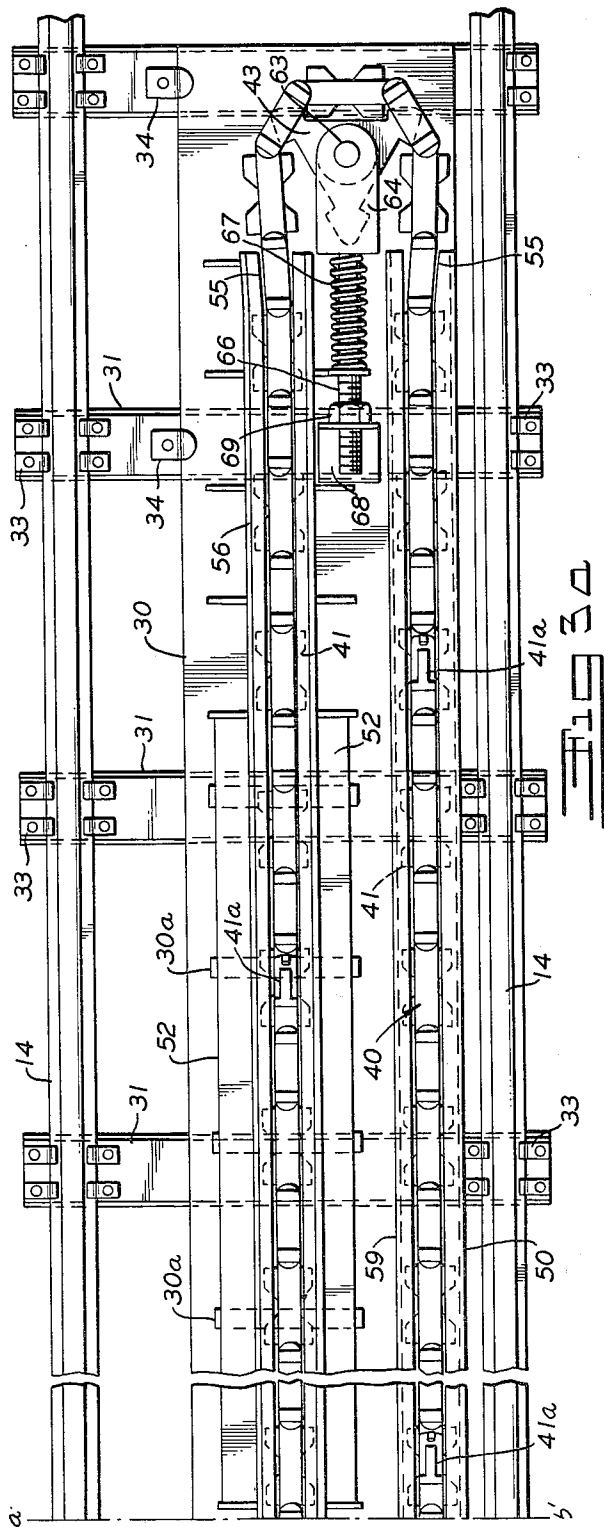
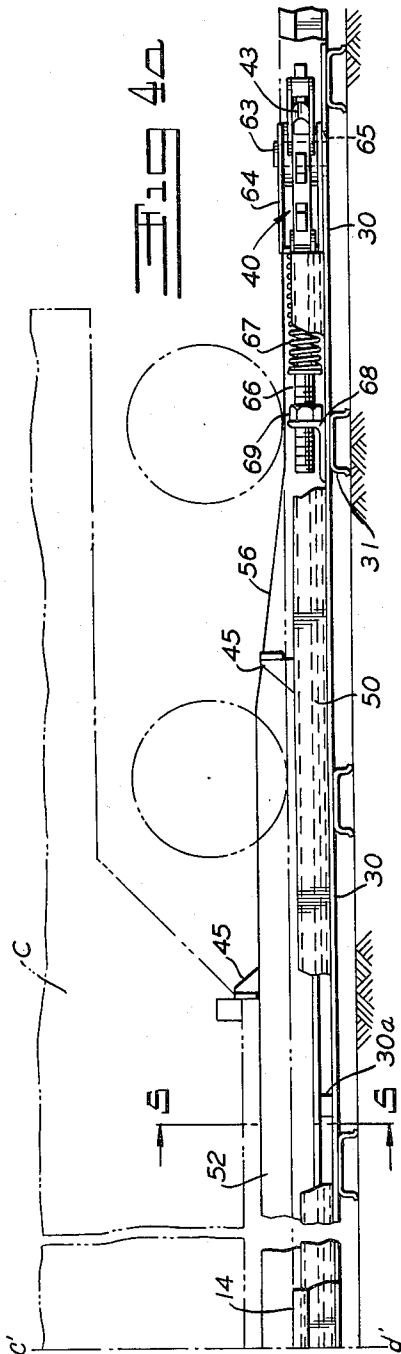
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CAR-RETARDING AND HOLDING MECHANISM

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4 Sheets-Sheet 3



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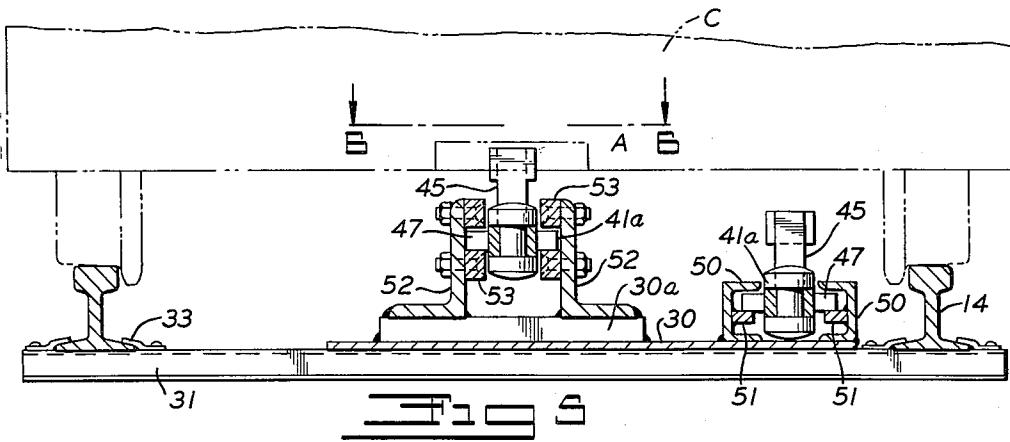
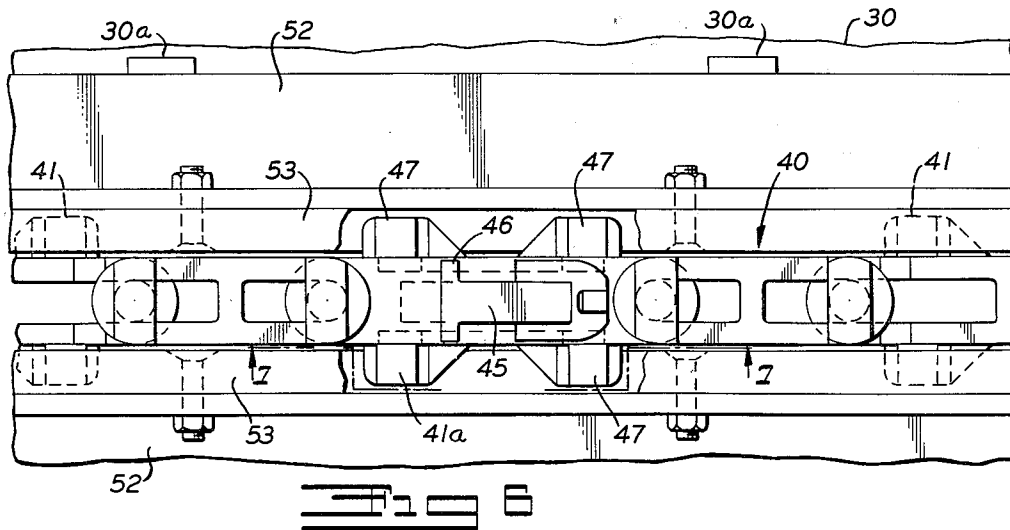
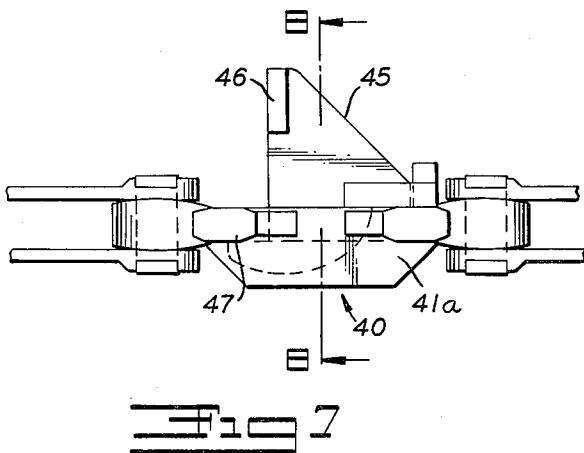
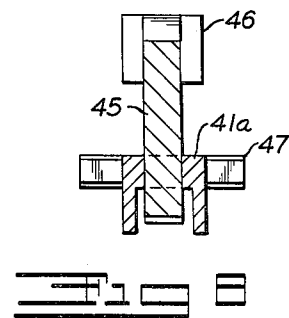
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CAR-RETARDING AND HOLDING MECHANISM

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4 Sheets-Sheet 4



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2,994,283

CAR-RETARDING AND HOLDING MECHANISM
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7 Claims. (Cl. 104—162)

This invention relates to car-retarding and holding mechanism. It has to do, more particularly, with a car-retarding and holding system which is particularly useful in retarding and holding cars that are to be moved to a particular location or station along a trackway upon which they are mounted for movement. The mechanism of this invention is especially useful in conjunction with fluid-actuated car-moving apparatus of the type disclosed in my Patent No. 2,847,945 which issued August 19, 1958.

In my said patent, there is disclosed a fluid-actuated car-moving apparatus embodying a low base frame adapted to be placed flatly on the bed of a trackway beneath the body frames and axles of material-transporting cars movable over the trackway, the frame being placed between the spaced parallel rails of the trackway and anchored in operative relation with the rails. The apparatus further embodies a composite track unit for such car-moving apparatus on which is mounted a pair of spaced, longitudinally extending cylinders, the latter carrying slidable, fluid pressure-actuated pistons. These pistons are adapted to be connected with the inner ends of externally projecting rods which are united at their outer ends with a pair of slidably mounted and guide-confined carriers, the latter being provided with movable car-engaging dogs which are pivotally carried by, and project yieldably in an upward direction from, the carriers. A flexible chain member or wire rope is joined at its ends with the carriers, the chain member or rope being trained around a guide sprocket or other equivalent means rotatably supported on the base frame of the apparatus, so that as fluid is admitted under pressure into an end of one of said cylinders to force the piston and rod thereof outwardly on a car-advancing stroke, the other of said pistons is retracted and fluid expelled from the cylinder containing the same.

The car-retarding and holding mechanism, although not necessarily limited to the above-described car-moving apparatus, is particularly useful in combination therewith to check the movement of mine cars as they are moved to or from loading or discharge stations or other stations along a trackway.

A primary object of the present invention is to provide a novel and improved car-retarding and/or holding mechanism by which the movement of one or more cars over a trackway may be controlled systematically, as in checking the speed of mine cars being moved to a loading or discharge station or between other stations, when making up coupled trips of such cars, or in releasing individual cars from a coupled train or trip thereof.

Another object of this invention is to provide novel movement retarding or controlling mechanism wherein a base-supported braking apparatus is provided in conjunction with a trackway for motion-governing engagement with a car moving over the same.

Another object of this invention is to provide mechanism of the type indicated in which the motion-governing engaging means for the cars includes dogs which are brought into and out of engagement with the cars without danger of snapping off the dogs.

Another object of this invention is to provide braking mechanism of the type indicated which is automatically set in retarding or braking condition for cars moved into

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association therewith and remains in such condition until it is positively released by suitable control mechanism.

A further object of this invention is to provide control mechanism which will control the brake mechanism in accordance with movement of the cars into or out of association therewith.

Another object of this invention is to provide car-controlling apparatus of the type indicated above which occupies a minimum amount of height so that it can be disposed flat between the car-guiding tracks without the provision of pits between the tracks for receiving it, the apparatus merely resting on the track-supporting cross-ties and being clamped in position between the tracks.

A further object of this invention is to provide a trackway mounted, fluid-controlled, car-retarding and/or holding mechanism of economical and simplified construction which constitutes an improvement over prior art apparatus used for this same general purpose.

Various other objects will be apparent.

The accompanying drawings illustrate the preferred embodiment of this invention but it is to be understood that specific details may be varied without departing from basic principles.

In these drawings:

FIGURE 1 is a schematic plan view of a car-retarding unit according to this invention showing it associated with a car-advancing or moving unit.

FIGURE 2 is a diagram illustrating the use of the apparatus illustrated in FIGURE 1.

FIGURES 3 and 3a are companion views in plan of the car-retarding unit of this invention.

FIGURES 4 and 4a are companion views in side elevation of the car-retarding unit.

FIGURE 5 is an enlarged transverse sectional view taken along line 5—5 of FIGURE 4a.

FIGURE 6 is a horizontal plan view taken along line 6—6 of FIGURE 5.

FIGURE 7 is a longitudinal sectional view taken along line 7—7 of FIGURE 6.

FIGURE 8 is a transverse sectional view taken along line 8—8 of FIGURE 7.

FIGURE 9 is a longitudinal sectional view through a valve used in the hydraulic control system of the apparatus.

FIGURE 10 is an enlarged detail of the brake unit and operating mechanism.

With reference to the drawings, in FIGURES 1 and 2, there are illustrated a car-advancing or feeder unit 11 and a car-retarding or holding unit 12. The unit 11 may be of the type disclosed in Patent No. 2,847,945 and the unit 12 is designed and constructed in accordance with the present invention.

The car feeder unit 11 is only illustrated generally as it is of the same general type disclosed in said patent. It comprises a base frame 13 which is flat and is disposed longitudinally between the parallel tracks 14 upon which the cars C are mounted for rolling guided movement. The frame 13 is clamped in position between the tracks by means of the clamps 15 and is additionally held from rearward movement by means of links 16 at the forward end thereof. The feeding mechanism includes a pair of cylinders 17 and 18 which are rigidly mounted on the frame 13 in longitudinally extending spaced parallel relationship. Each cylinder 17 or 18 is provided with a piston which carries a forwardly projecting piston rod 20. A flexible wire or chain 22 passes around a sprocket 23 mounted on a vertical axis at the rear end of the frame 13 and one end is connected to a dog carrier or barney 21 which is also connected to the outer end of the rod 20 of the cylinder 17. The other end of the chain is connected to an identical dog carrier or barney 21c. Connected between this carrier 21c and another

barney 21a, which is not provided with a dog, is a spacer bar 21b.

This unit 11 functions to move cars along the tracks 14 in the manner described in detail in said patent. This is accomplished by alternately supplying pressure fluid to the cylinders 17 and 18 which move the piston rods 20 alternately back and forth. During the forward movement of each piston rod 20 the dog on the associated carrier 21 engages an abutment A (FIGURE 2) on the car C disposed over the unit 11, to move such car forwardly. During reverse movement of each dog carrier 21, the dog carried thereby pivots, as described in said patent, when engaging the abutment A so as not to cause return movement of the car.

As described in said patent, a hydraulic system is provided for controlling the unit 11 and may consist of a pump 25 and a reversing valve 26, the latter being connected to the rear ends of the cylinders 17 and 18. As will be explained later, this hydraulic system also preferably includes a control valve 27 which controls the car retarding unit 12.

The unit 12 is illustrated in detail in FIGURES 3 to 8, inclusive. The views of FIGURES 3a and 4a are continuations to the right of the views of FIGURES 3 and 4, respectively, the line a' and b' of FIGURE 3a being adapted to be matched with the line ab of FIGURE 3 and the line c'd' of FIGURE 4a being adapted to be matched with the line cd of FIGURE 4. The unit 12 comprises a flat frame 30 which is disposed longitudinally between the tracks or rails 14 ahead of the unit 11 when it is used with such unit. The frame 30 rests on the ties 31 which support the rails of tracks 14 that are clamped to the ties by clamping members 33. The frame 30 is clamped to some of the ties by clamping members 34 which are fastened to the ties and extend over the edges of the frame 30. At its forward end, the frame 30 includes a transverse frame member or tie 31a which has its ends clamped to the tracks 14 by clamps 33a. Anchoring links 35 are also connected to the forward end of the frame 30 at 36. These links include turnbuckles and their forward ends are connected at 37 to the anchoring brackets 38. The brackets 38 are clamped to the associated tracks 14 by means of the clamps 39. Another cross-frame member 31a is preferably provided at a location spaced rearwardly of the first member 31a, as shown in FIGURE 3.

The frame 30 is mainly in the form of a flat plate. Mounted on the plate is an endless chain 40 which is composed of a series of pivoted links 41. The chain passes horizontally around a sprocket 42 at the forward end of the frame and around a sprocket 43 at the rear end of the frame. The sprockets are supported on vertical axes toward one side of the trackway and the chain is, therefore, provided with an inner run about midway of the tracks 14 and an outer run adjacent one of the tracks 14, as shown best in FIGURES 1, 3, and 3a. The chain 40 is provided with dog-carrying links 41a at longitudinally spaced intervals, each of these links being provided with an upstanding dog 45 that has a car-engaging abutment 46 on its upper and forward corner, considering the inner run of the chain. Each link 41a is also provided with laterally-extending guide ears 47 extending from both sides at its forward and rearward ends, and each link 41 is provided with similar ears, these details being shown best in FIGURES 5 to 8.

The outer run of the chain 40 is supported in guide channels or guideways formed by a pair of channel members 50 which are secured to the base plate or frame 30 (FIGURE 5) in parallel relationship therealong being faced toward each other. The ears 47 of the links 41 and 41a rest on wear strips 51 welded within the opposed channels 50. The inner run of the chain 40 is supported by angles 52 which are secured to thicker plates 30a that, in turn, are secured to the upper surface of the frame plate 30. The angles 52 are disposed in spaced parallel relationship substantially midway of the tracks 14. Each

of the angles 52 is provided on its inner surface with a pair of vertically spaced horizontally disposed guide strips 53 which provide guideways or channels for receiving the ears 47 on the links 41a and 41. Thus, for the inner and outer runs of the chain, opposed horizontal guideways are provided for receiving and guiding the guide ears on the chain links. These guideways guide the chain both laterally and vertically. It will be noted from FIGURE 5 that the guideways for the inner run will support the chain at a higher level than the guideways for the outer run. As indicated in FIGURE 3, the inner and outer guideways are disposed parallel with each other. The ends of each guideway has a flared throat, as indicated at 55, to facilitate passage of the links of the chain 40. The outer guideway formed by the members 50 is at the same level throughout its length being just above the frame plate 30. The inner guideway formed by the members 52 is, as indicated, at a higher level throughout most of its length but at both of its ends is provided with an inclined or ramp section 56. These inclined or ramp sections provide for changing the level of the chain between the different levels of the inner and outer guideways so that the inner reach of the chain 40 is at such a level that the abutments 46 thereon may engage car abutments A and the outer reach of the chain is at another, lower level so that the abutments 46 thereon may clear all portions of the cars.

The sprocket 42 is supported in a fixed position at the forward end of the frame plate 30, as indicated best in FIGURE 4. The sprocket shaft 60 is vertically disposed and is carried by the spaced bearing members 61 and 62, which are mounted on the respective plates 30 and 30b, the latter being supported at a slightly lower level than the former by the cross frame members 31a. The sprocket 43 at the opposite end is supported by a vertical shaft 63 which is mounted for adjustment longitudinally of the frame plate 30 to provide for chain take-up. The shaft 63 is carried by a sprocket bracket or yoke 64. The yoke 64 is slidably mounted on the frame plate 30 and the lower end of the shaft 63 extends into a longitudinal slot 65. The bracket 64 is also slidably mounted on the rear end of a take-up shaft 66 which carries a compression spring 67 for pushing the bracket 64 outwardly. The shaft 66 is slidable in a bracket 68, and a take-up nut 69 is threaded on the shaft 66 and engages the bracket 68.

A braking unit 70 is associated with the front sprocket 42 for normally applying a braking force thereto, and therefore, to the chain 40, and is preferably of the friction type. As shown in FIGURES 3 and 4, the connection of the sprocket 42 to the braking unit 70, includes a chain 71 which passes around a sprocket 72 that may be formed as a unit with the sprocket 42 or be non-rotatably connected thereto in some other manner. The chain 71 passes around a sprocket 73 which is keyed on a vertical shaft 74 spaced inwardly and forwardly of the shaft 60 but being parallel thereto. This shaft 74, like the shaft 60, is mounted in suitable bearings carried by the plate 30. Keyed on the upper end of the shaft 74 is a brake wheel 75. Thus, the sprocket 73 and the wheel 75 are keyed together as a unit. Surrounding the brake wheel 75 is a split brake-band 76 which is normally contracted around the wheel. For this normal contraction, an actuating lever 76a of the bell crank type is pivoted at 77 to a bracket 78 upstanding from the plate 30. One end of the brake band is anchored to the bracket 78 at 79 and the other end is connected to the lever 76a at 80. Thus, as the lever 76a swings about the pivot 77, the brake is applied or released. A compression spring 81 engages the outer end of the lever 76a to move it in a direction to contract the brake band 76 about the wheel 75 to normally apply the brake. This compression spring is carried by a pin 82 which passes through the end of the lever and is pivotally connected to the plate 30 at 83.

To overcome the force of the spring 81 to release the

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brake, a fluid-actuated unit 84 is provided in the form of a single-acting cylinder and piston unit. This unit comprises a cylinder 85 fixed to the plate 30 and a piston 86 therein. A rod 87 extends out from the piston and its outer end is pivotally connected at 88 to one arm of the lever 76a. Outward movement of the rod 87 swings the lever 76a about the pivot 77 so as to loosen the brake band 76 on the drum 75 and release the brake. The braking force may be varied by varying the tension of the spring 81 by means of an adjusting nut 89 on the outer end of the pin 82.

The cylinder 85 is connected in the hydraulic system as shown in FIGURE 1. Thus, the pressure end of the cylinder 85 is connected to the control valve 27 previously mentioned. The valve 27 is of the spool type having the spool member 91 reciprocable in the tubular housing 92. Normally, a compression spring 93, which can be adjusted by the screw 94, keeps the spool to the left as shown in FIGURE 9. At this time, the brake-releasing line 90 is connected to an exhaust line 95. A pressure line 96 is arranged in communication with the side of the spool opposite the spring 93, and the opposite end of this line is connected with the discharge outlet of the pump 25 which leads to the valve 26, so that each time pressure is applied to either of the cylinders 17 or 18, to move a car C, it is also applied to the spool 91 to move the latter sufficiently to disconnect the line 90 from the exhaust line 95 and to connect the line 90 to the pressure line 96. Thus, pressure will be supplied in the line 90 and the unit 85 will be actuated to release the brake unit 70 upon actuation of either of the cylinders 17 or 18.

It will be apparent that in operation, the unit 12 will normally be in car-retarding condition due to the fact that the brake unit 70 is applying a braking force to the chain 40 and is holding it stationary. At this time, as indicated in FIGURE 2, it may be assumed that the forwardmost car C of the trip of cars moved by the unit 11 is held stationary by engagement of one of the dogs 46 with an abutment A on that car. This dog will be on the inner run of the chain 40. The braking unit 70, as indicated, will at this time prevent movement of the chain 40. As soon as one of the cylinders 17 or 18 or the unit 11 acts on the rearwardmost car C to move it, the brake 70 is released so that the chain 40 of the unit 12 under the forwardmost car is released and the dog 46 will be moved therewith permitting movement of the car. As the engaged dog 46 reaches the downwardly inclined guide section 56 at the forward end of the unit 12, the dog will be disengaged from the car, thereby permitting continued movement of that car. At the same time, a second dog 46 will be moving up the forward inclined guide section 56 into position to engage the forwardmost abutment A on the second car and apply a retarding and ultimate stopping force to the second car. Thus, at any time when the trip of cars is being shoved by the unit 11, the retarding force on the cars by the unit 12 is released so that the retarding dogs 46 cannot be damaged. The retarding force of the dogs results when they move into the center guideway along the rearward section 56 where they gradually rise into contact with the abutments A of the car. The dogs are released from the abutments by downward movement along the forward inclined section 56 of the guideway. When the dogs are along the outer run of the chain in the outer guideway, they are at a low level where they will not interfere with the cars. When the dogs are engaged and the pressure to actuate the unit 11 is released, the brake unit 70 is applied under the force of the spring 81 and the retarding and stopping force immediately acts on the car to bring it to a stop.

It will be apparent that this invention provides a simple yet effective car-retarding unit. The unit provides for control of the cars by a systematic application of the retarding force. The retarding dogs are brought into and

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out of engagement with the car to be retarded without danger of damage to the dogs. The control mechanism for the retarding unit is such that it can be incorporated in a system with a car-moving unit so that it will be synchronized therewith.

According to the provisions of the patent statutes, the principles of this invention have been explained and have been illustrated and described in what is now considered to represent the best embodiment. However, it is to be understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

Having thus described this invention, what is claimed is:

1. In combination with a trackway having a track bed and a pair of transversely spaced, parallel tracks supported by and extending above said bed; a car-retarding apparatus comprising a relatively flat supporting frame arranged on said track bed between said tracks; an endless carrier rotatably carried by said frame and having opposite runs thereof extending above said frame and longitudinally of and generally parallel to said tracks; guide means carried by said frame for movably guiding the runs of said carrier during rotation thereof and arranged to maintain one of the runs of said carrier in vertically offset relation to the opposite run thereof; a member carried by and projecting upwardly from said carrier and releasably engageable with a car passing over said tracks when along one of the runs of the carrier and to clear the car when along the opposite run thereof; and releasable brake means connected with said carrier and operable to retard rotation of said carrier and thereby retard the movement of a car engaged by said member.

2. A portable car-retarding apparatus adapted to be mounted in a trackway and comprising a substantially flat base frame arranged to be positioned flatly between a pair of track rails of a trackway; an endless movable carrier mounted on said frame and having opposite runs thereon extending longitudinally of said frame and disposed in substantially parallel, transversely spaced relation to one another; means on said frame for maintaining one of the runs of said carrier in relatively elevated relation to the opposite run thereof; an upwardly projecting dog carried by said carrier and arranged to releasably engage a car traversing a trackway in which said apparatus is positioned when along one of the runs of the carrier and to clear the car when along the opposite run thereof; and releasable brake means carried by said frame adjacent said carrier and drivingly connected with said carrier for retarding the movement of said carrier and a car engaged by said dog.

3. In combination with a car movable over a trackway; car-retarding apparatus comprising a substantially flat base frame arranged for mounting in a trackway between a pair of spaced parallel track rails; an endless movable carrier carried by said frame and having opposite runs thereon disposed in transversely spaced relation and extending longitudinally above said frame; a dog carried for movement with and projecting upwardly from said carrier and releasably engageable with a car passing over said trackway; a pair of transversely spaced, longitudinally extending guideways carried at different vertical levels on said frame and engageable respectively with the opposite runs of said carrier for guiding said runs at different vertical levels during movement of said carrier so that said dog on the carrier will engage the car when along one of the runs of the carrier and will clear the car when along the opposite run of the carrier; and releasable brake means carried by said frame and connected with said carrier for normally retarding the movement of said carrier and a car engaged by said dog.

4. The combination defined in claim 3, wherein said brake means includes a spring arranged to normally apply said brake means, and fluid-pressure-actuated

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means operable to release said brake means against the action of said spring.

5. In combination with cars movable over a trackway, car-retarding apparatus comprising a base frame mounted below the trackway; a pair of sprockets rotatably carried at longitudinally spaced positions on said frame; an endless chain trained around said sprockets and having opposite runs disposed longitudinally and in transversely spaced relation above said frame; a dog carried by and projecting upwardly from said chain and releasably engageable with a car passing over said trackway; a pair of transversely spaced, longitudinally extending guideways carried at different vertical levels on said frame and arranged, respectively, to guide the opposite runs of said chain at different vertical levels during movement thereof so that said dog on the carrier will engage the car when along one of the runs of the carrier and will clear the car when along the opposite run of the carrier; ramps located at the ends of said guideways for transferring said chain and the dog carried thereby from the level of one guideway to that of the other guideway; and releasable brake means carried by said frame and drivingly connected with one of said sprockets and operable to retard the movement of said chain and a car engaged by said dog.

6. The combination defined in claim 5, wherein said chain includes laterally projecting guide ears, and said guideways each comprises a pair of opposed guide mem-

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bers between which the guide ears extend for both lateral and vertical guiding movement.

7. In combination with cars movable over a trackway, a car-advancing unit positioned below said trackway and including fluid-pressure-actuated means engageable with a car on said trackway and operable to advance said car over said trackway; and a car-retarding apparatus comprising base frame positioned below said trackway; a movable endless carrier mounted on said frame and having a member thereon releasably engageable with a car previously advanced over said trackway by said car-advancing unit; releasable brake means connected with said carrier and operable normally to apply a retarding force to said carrier; and a second fluid-pressure-actuated means connected with said brake means and with the fluid-pressure-actuated means of said car-advancing unit for releasing said brake means in response to the operation of said car-advancing unit.

References Cited in the file of this patent

UNITED STATES PATENTS

690,814	Acklin	Jan. 7, 1902
1,220,122	Hewitt	Mar. 20, 1917
2,572,011	Cohen et al.	Oct. 23, 1951
2,630,077	Tate	Mar. 3, 1953
2,689,036	Mullen et al.	Sept. 14, 1954
2,847,945	Merritt	Aug. 19, 1958