Feb. 1, 1927. 1,616,368

N. L. HARMON

AUTOMATIC FEEDER

Filed Jan. 29, 1926 4 Sheets-Sheet 1

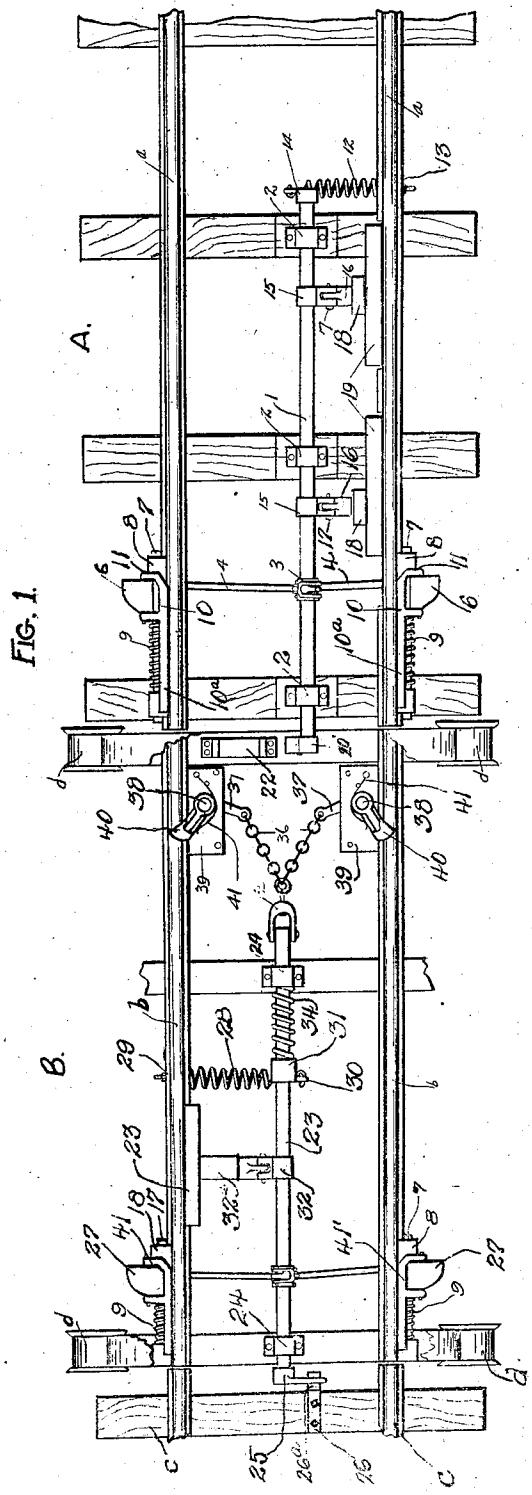


FIG. 1.

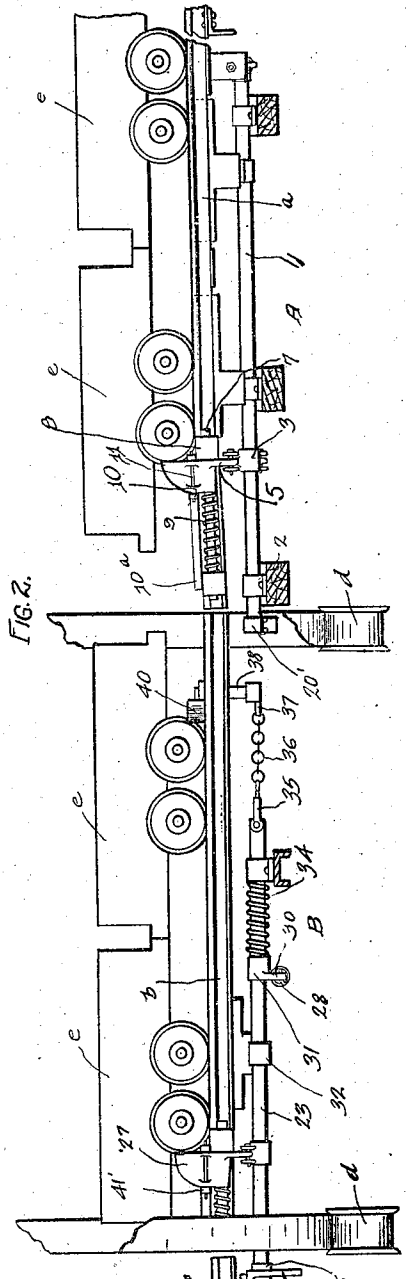


FIG. 2.

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4 Sheets-Sheet 2

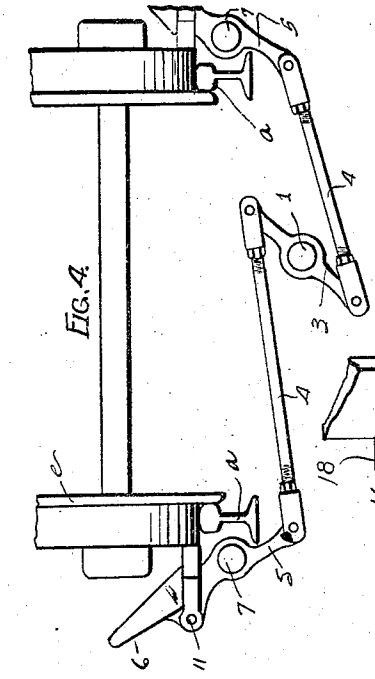


FIG. 4.

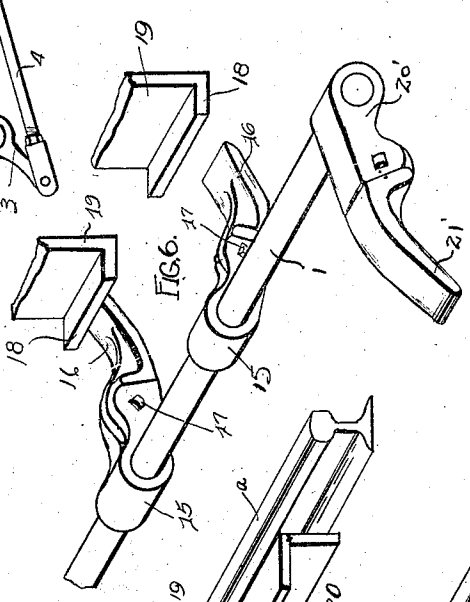


FIG. 6.

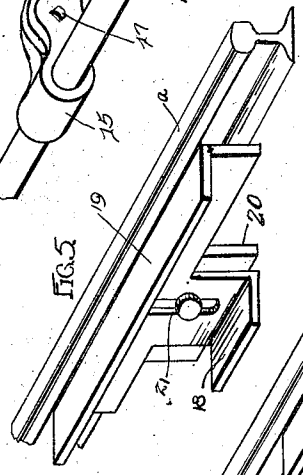


FIG. 5.

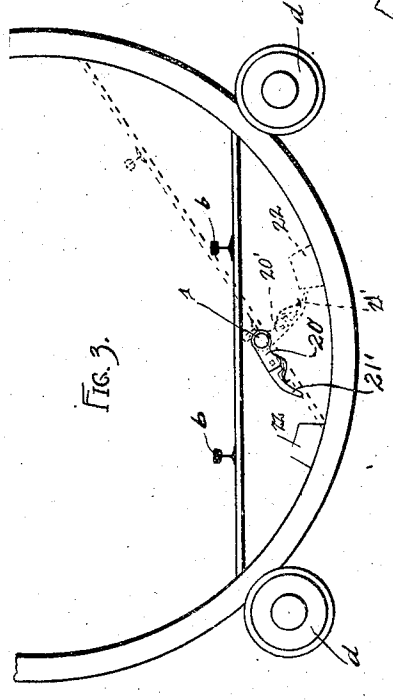


FIG. 3.

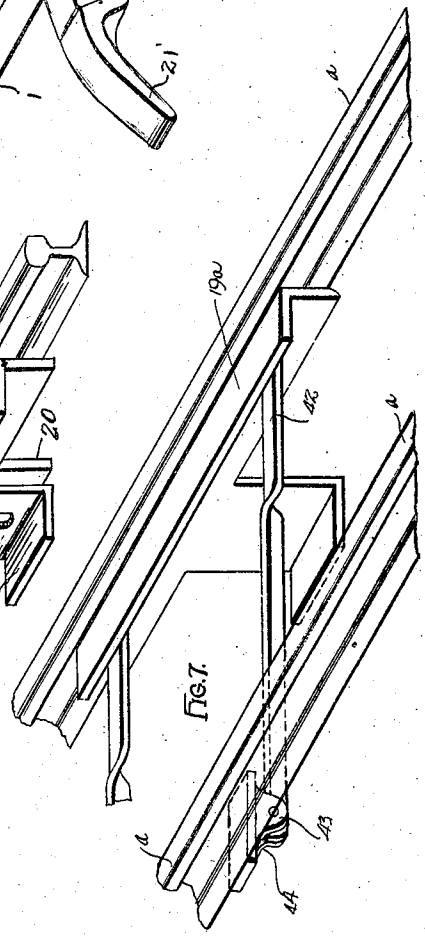


FIG. 7.

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AUTOMATIC FEEDER

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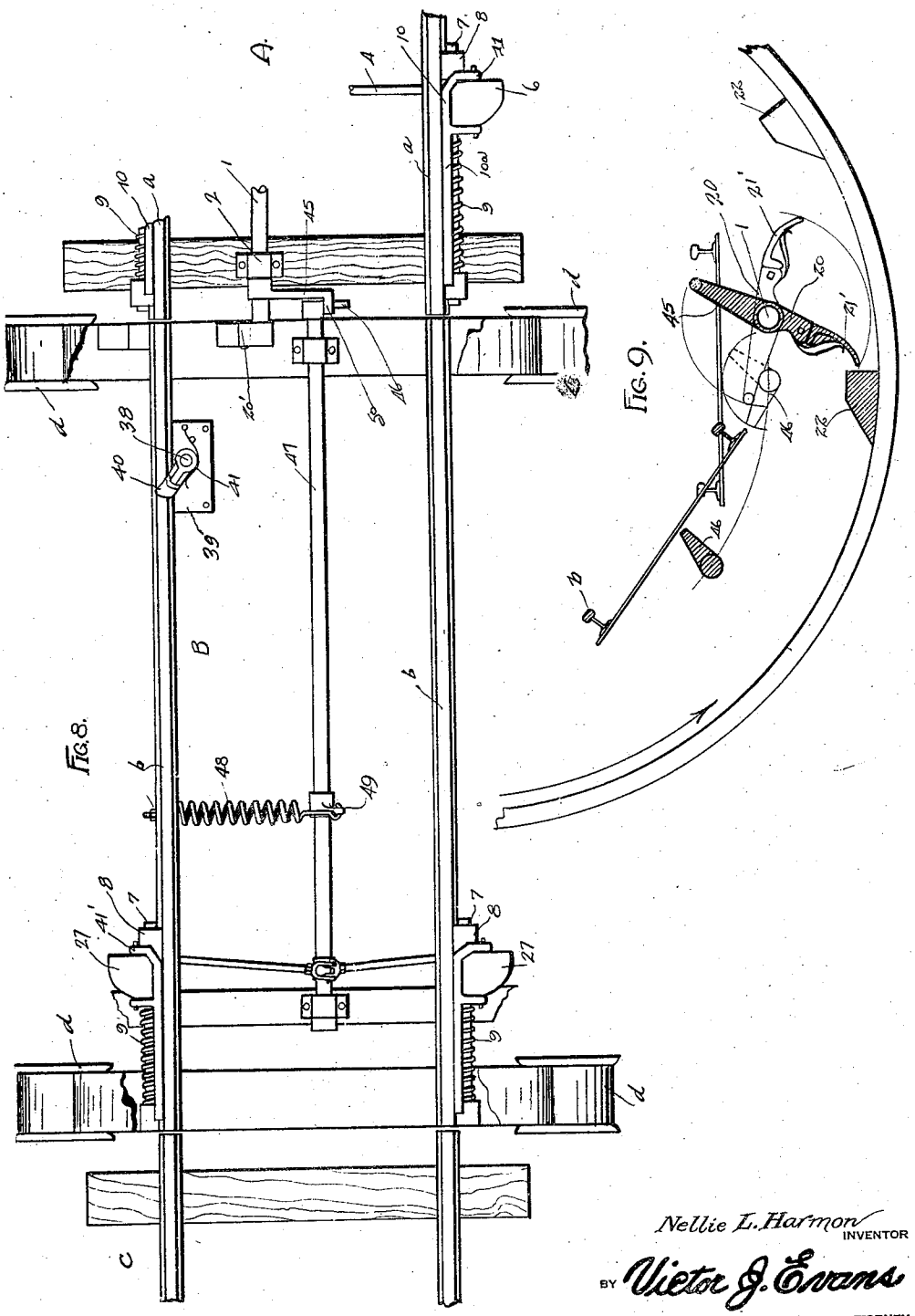


FIG. 8.

FIG. 9.

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AUTOMATIC FEEDER

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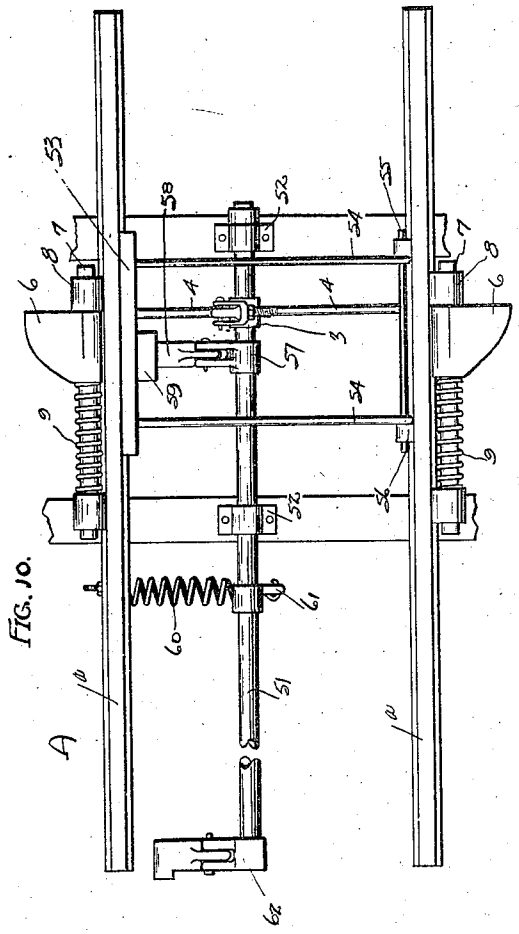


FIG. 10.

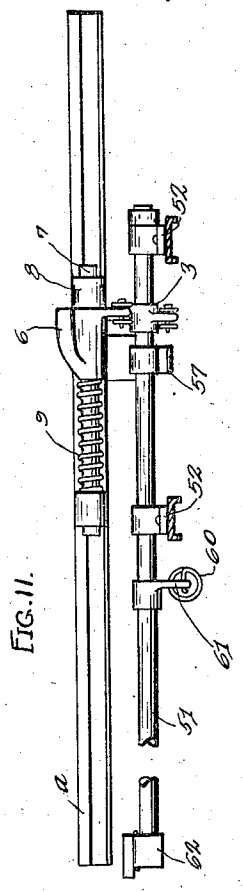


FIG. 11.

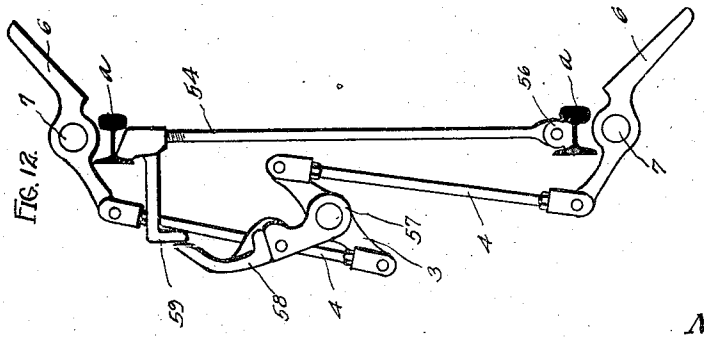


FIG. 12.

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Patented Feb. 1, 1927. 1,616,368

UNITED STATES PATENT OFFICE.

NELLIE L. HARMON, OF BOWERSTON, OHIO.

AUTOMATIC FEEDER.

Application filed January 29, 1926. Serial No. 84,685.

This invention relates to apparatuses to be used in mining operations, and more particularly to an automatic feeder for feeding cars of coal onto dumps, cages and other structures.

One of the main objects of the invention is to provide a feeder of comparatively simple construction and operation whereby a plurality of cars may be fed onto a cage or dump. A further object is to provide a feeder in combination with a dump or other structure movable relative to the feeder, means being provided for opening the stops of the feeder when the dump or other structure is moved into loading position. A further object is to provide simple and efficient means on the dump or other structure for holding the cars loaded thereon, this means being moved into open position as the dump or other structure moves into loading position and being automatically operated to permit the empty cars to be removed from the dump or structure, the entering loaded cars being stopped and held in position. Further objects will appear from the detailed description.

In the drawings:

Fig. 1 is a plan view of the feeder and a dump associated therewith provided with car holding and releasing means.

Fig. 2 is a side view of the apparatus illustrated in Fig. 1.

Fig. 3 is an end view of the feeder looking from the exit end of the dump, parts being omitted.

Fig. 4 is a detail end view of the approach track stops and associated parts viewed from the direction of the dump.

Fig. 5 is a perspective detail of one of the holding treadles.

Fig. 6 is a perspective detail of the feeder rocker shaft and the holding treadles and associated parts.

Fig. 7 is a perspective detail of a modified form of the mounting of the holding treadles.

Fig. 8 is a plan view of a modified form of dump receiving and holding means and feeder.

Fig. 9 is a fragmentary end view of the dump illustrating the operation of the modified form of feeder and dump receiving and holding means illustrated in Fig. 8.

Fig. 10 is a plan view of a modified form of feeder.

Fig. 11 is an elevation of the form of feeder illustrated in Fig. 10.

Fig. 12 is an end view of the form of feeder illustrated in Fig. 10.

My apparatus is intended to be used in connection with a dump, cage, or other structure used in mining operations which is moved into and out of loading position relative to a loading platform or track. In the form illustrated I have disclosed the apparatus as used in connection with a rotary dump B of known construction which is mounted for movement into and out of loading position relative to an approach track A. A receiving track C is disposed to be aligned with the rails of the dump section of the track for receiving empty cars from the dump. The dump is of known construction and is rotatably mounted upon anti-friction supports or rollers *d*, the dump structure itself being rotated in a known manner. While I have illustrated a rotary dump of known construction, my apparatus can be used also in connection with a cage or other structure which is moved relative to the approach track A in such manner that the means employed for actuating the feeder and the car receiving and holding means on the structure is moved vertically relative to the approach track in that such means is moved from one position to another position either higher or lower than its first position, whether this movement takes place due to rectilineal movement of the structure or turning movement thereof, as in a rotary dump.

A shaft 1 is rockably mounted in suitable bearing members 2 on the approach track A and between the rails thereof. A cross-head 3 is secured on this shaft and has its arms connected by link structures 4 to arms 5 or stops 6. These stops are rockably and slidably mounted on bars 7 which are secured through supporting blocks 8 secured to the web portions of rails *a* of approach track A. Cushion springs 9 are mounted about bars 7 and are confined between stops 6 and the blocks 8 adjacent the entrance end of the dump. Yokes 10 are pivotally secured by pintles 11 on stops 6 in position to extend inwardly over the tread portions of rails *a* when the stops are closed. When the stops are open the yokes are disposed in substantially horizontal position and extend inwardly beyond the stops toward the rails, as

illustrated in Fig. 4. Each yoke is provided with an extension 10^a which projects in the direction of the dump B. A tension spring 12 is secured at one end 13 to one rail *a*, the other end of this spring being secured to an arm 14 secured on the end of shaft 1. The spring acts to turn shaft 1 in the proper direction to hold the stops 6 closed and extending inwardly over the treads of the rails, the stops being positioned at such time as to contact with the wheels of a mine car *e* supported upon the approach track above the stops. Contact of the stops with the rails limits inward movement thereof and therefore turning movement of the shaft 1 in stop closing direction.

Two arms 15 are secured on shaft 1 in spaced relation. Each of these arms includes an inner member which is secured on the shaft and an outer member or nose 16 which is hinged at 17 to member 15. The inner member and member 16 are so related that member 16 can turn inwardly and upwardly about its axis of movement but downward movement of member 16 beyond a position in substantial alignment with the inner member of the arm is positively limited. This outer or nose member 16 is normally held in its operative position by gravity. When shaft 1 is turned into its full open position, as illustrated in Fig. 1, the upper or outer arm 15 is so disposed that the nose member 16 thereof engages beneath flange 18 of the upper or outer one of two holding treadles 19 which are mounted adjacent one rail *a* of approach track A in spaced relation. Treadle 19 is slidably mounted on a plate 20 secured to rail A by means of pin and slot connections 21, or in any other suitable or preferred manner. This permits of vertical movement of treadle 19 so that this member can be raised sufficiently to permit nose 16 of the upper arm 15 to pass out of engagement with flange 18. The lower or inner arm 15 is disposed for engagement with flange 18 of a lower or inner treadle 19 mounted similarly to the upper treadle 19. The inner arm 15 is so disposed on shaft 1 that it is held spaced away from flange 18 of the inner treadle 19 when nose 16 of the outer arm 15 is in contact with flange 18 of the outer treadle.

A crank arm 20′ is secured on the inner end of shaft 1 which extends a short distance into the dump structure. The arm 20′ is constructed similarly to arms 15 but is directed oppositely thereto. When shaft 1 is turned into stop closing position in a counter-clock-wise direction as considered in Fig. 3, nose member 21′, of arm 20′ is disposed in the path of travel of a trip member 22 carried by the dump structure, as indicated in Fig. 3. As the dump returns to loading position after an overturning operation and travelling in a clock-wise direction as considered in Fig. 3, trip member 22 contacts with nose 21′ of arm 20′ thus rocking shaft 1 in a clock-wise direction as considered in Fig. 3 turning the shaft into stop opening position, at which time arm 20′ occupies the full line position illustrated in Fig. 3. This opens the stops 6 releasing the cars *e* above the stops and permitting travel of the same toward the dump structure. The wheels of the cars *e*, when the stops are closed, rest upon the holding treadles 19 so as to hold the same depressed. As the shaft 1 is turned in stop opening direction by the trip member 22 and associated parts, the nose members of arms 15 are moved upwardly and inwardly about their pivots and then drop by gravity so as to be positioned beneath the flanges 18 of the inner and outer release rails. As soon as the trip member passes out of contact with nose member 21′ of arm 20′ the spring acts to turn shaft 1 in stop closing direction, but this movement of the shaft is prevented by contact of nose member 16 of the outer arm 15 with flange 18 of the outer treadle 19. The stops are thus held open and the cars *e* are caused by gravity to travel upon the approach track A toward the dump, this approach track being slightly inclined as is the common practice. As the rear wheel of the second car passes off of the upper or outer treadle 19 this treadle is moved upwardly by the action of spring 12 and the outer arm 15 sufficiently to permit nose member 16 of this arm to pass out of contact with flange 18 of the release rail, which drops by gravity into its normal lowered position. Further turning movement of shaft 1 is limited by contact of nose member 16 of the inner arm 15 with flange 18 of the inner treadle 19 which is held depressed by the front wheel of the second car, the front wheel of this car passing onto the inner treadle 19 slightly prior to the passage of the rear wheel of the second car off of the outer treadle 19, so that the stops are retained in their open position, the movement of shaft 1 at this time being but very slight. After the second car passes off of the inner treadle the shaft 1 is rotated by spring 12 in stop closing direction raising the inner release rail until nose member 16 of the inner arm 15 passes out of contact with flange 18 of this treadle, after which this rail is returned to lowered position by gravity. Complete closing of the stops after the second car passes off of the inner rail is prevented by contact of the yokes 10 with the outer faces of the car wheels, the extensions 10^a of the yokes holding the stops 6 in open position until the second car has passed well beyond these stops. After the car has passed from between the yokes, the spring 10 acts to complete turning of shaft 1 thus closing the stops 6 in advance of the wheels of the third car. The following cars of the

trip do not affect the holding treadles which are in lowered position and the stops act to hold back the trip after the two cars to be loaded onto the dump structure have been cut out in the manner described. The cars loaded onto the dump are discharged after which the dump returns to loading position and the operation above described is repeated.

A shaft 23 is rockably mounted in bearing blocks 24 secured to the dump structure. This shaft is provided at one end with a crank arm 25 secured thereon and disposed for contact with a trip member 26 of inverted L-shape secured to tie *c* of the receiving track C. Stops 27 are mounted adjacent rails *b* of the dump track, these stops being mounted in the same manner as stops 6 and being connected to shaft 23 for movement toward and away from the rails *b* in accordance with rocking movement of shaft 23 in the same manner as stops 6 are connected to shaft 1. A tension spring 28 has its outer end secured at 29 to one of the rails *b* or anchored in any other suitable or preferred manner, the inner end of this spring being secured to a finger 30 extending from a collar 31 secured on shaft 23. The spring 28 acts to turn shaft 23 in stop closing direction. A holding and release arm 32 similar to the arms 15 is secured on shaft 23 and is disposed to engage beneath a foot 33^a extending from a treadle 33 similar to the treadles 19 and mounted upon rail *b* for vertical movement in the same manner as the treadles 19 are mounted. Shaft 23 has longitudinal movement through bearing blocks 24 and is normally urged toward the exit end of dump B by an expansion coil spring 34 mounted about the shaft and confined between collar 31 and the adjacent bearing block 24. A swivel 35 is secured to the inner end of shaft 23 and is connected by chains 36 to arms 37 secured on shafts 38 rockably mounted through supporting plates 39 secured to rails *b* or any other suitable portion of the dump structure. Stop blocks 40 are secured on the shafts 38 and are urged toward the rails B by springs 41 carried by the plates 39 and contacting with the blocks, these blocks being so shaped as to extend across the tread portions of the rails *b*, the body portions of the blocks contacting with the rails so as to positively limit outward movement of the blocks. Yokes 41′ similar to yokes 10 are carried by the dump stops 27.

When the dump returns to loading position after an overturning operation the arm 25 contacts with the horizontal portion 26^a of trip member 26 thus turning shaft 23 in stop opening direction and causing the nose portion of arm 32 to pass beneath foot 33^a of rail 33. Simultaneously with the opening of stops 27 the stops 6 on the approach track are opened in the manner previously described. The entering loaded car contacts with the second car on the dump causing the empty cars to pass off of the dump between the stops 27. Travel of the entering loaded car into the dump forces blocks 40 inwardly away from rails *b* turning shafts 38 so as to retract shaft 23 and move arm 25 off of the horizontal portion 26^a of the trip member 26. This permits turning of shaft 23 by spring 28 until the nose portion of arm 32 contacts with foot 33^a of treadle 33, upward movement of the treadle being prevented by the weight of the second empty car, the wheels of which rest upon this rail, the first empty car having, at this time, passed beyond the treadle 33 through the yokes 41. At this point it should be noted that, when shaft 23 is turned into full stop opening position, the nose member of arm 32 is positioned a slight distance, approximately twenty degrees below foot portion 33^a of rail 33. As the first entering loaded car passes beyond the blocks 40 the second empty car passes off of the holding treadle 33 thus releasing the same and permitting it to be raised to such an extent that the nose portion of arm 32 raises the treadle and then passes out of contact with foot 33^a thereof, permitting the treadle to return to its lowered position by gravity. In this connection it should be noted that the treadle 33 is so positioned that the front wheels of the second empty car enter between the yokes 41′ before the rear wheels of this car pass completely off of the treadle. Closing of the stops 27 is prevented by contact of yokes 41′ with the outer faces of the wheels of the car so that these stops are held open by the yokes until the wheels of the second empty car have passed completely beyond the yokes, after which spring 28 turns shaft 23 so as to close the stops in advance of the first entering loaded car. In this manner, the two loaded cars which have been cut out from the trip are fed onto the dump and act to push the empty cars therefrom, the loaded cars being held in position upon the dump by the stops 27 and the blocks 40. In the event that the trip should be held back for any reason the empty cars will move off of the dump by gravity and the first loaded car entering the dump will operate the blocks 40 so as to pull back shaft 23 in the manner previously described. In this case the shaft 23 will be permitted to turn into full stop closing direction in view of the fact that the treadle 33 is not held against upward movement by the wheels of a car resting thereon. This results in closing the stops 27 in a single operation, instead of in the step by step method previously described. The loaded cars then enter the dump and are held thereon by the stops and the blocks in the manner previously described. It will

be noted that the apparatus on the dump is essentially a feeder and, if desired, this apparatus can also be used on the approach track for cutting the cars out of the trip and feeding them to the dump. Also, if desired, the apparatus on the dump can be replaced by the apparatus on the approach track. It will thus be seen that the two apparatuses are interchangeable, though I ordinarily prefer to use both of these apparatuses in the manner illustrated and described.

The feeder illustrated in Figs. 1 and 2, due to its construction, can also be readily converted into a one car feeder. This is accomplished by turning the nose portion 16 of the arm 15 more remote from stops 6 upwardly and inwardly toward shaft 1 so as to rest upon the body portion of the arm, in which position it may be secured in any suitable or preferred manner. This renders the outer treadle 19 and its cooperating arm 15 inoperative so that the shaft 1 is released when the first car passes beyond the inner treadle, and the stops 6 are released and permit turning of shaft 1 into stop closing position as soon as this car passes beyond the yokes 10. This provides simple and efficient means whereby the feeder may be readily adapted for feeding cars either singly or in tandem, as conditions may require.

In the modified means illustrated in Fig. 7 for supporting the holding treadle, the treadle 19^a is supported by means of bars 42 which extend across the approach track and are hingedly mounted at 43 in suitable brackets 44 secured to the rail *a* remote from the treadle. The operation of this treadle is in all respects the same as the operation of treadle 19 previously described.

In the modified form illustrated in Figs. 8 and 9 I provide a crank arm 45 secured on shaft 1 adjacent arm 20′ and directed oppositely thereto. This arm is positioned for contact with an arm 46 secured on the adjacent end of shaft 47 rockably mounted on the dump structure B. Shaft 47 is turned in stop closing direction by a tension spring 48 secured to one rail *b* at its outer end, the inner end of this rail being secured to an arm 49 which is secured on shaft 47. The feeder of which shaft 1 forms a part is similar in its construction and operation to that illustrated in Figs. 1 and 2. As the dump structure returns to loading position after an overturning operation, trip member 22 contacts with member 21′ of arm 20′ turning shaft 1 in stop opening direction. This moves arm 45 from its normal inoperative position indicated by the shaded lines in Fig. 9 into its operative position indicated by the light lines in this figure. Arm 46 is normally in raised position as indicated by the shaded lines in Fig. 9. Immediately after arm 20 has been turned so as to open the stops, arm 46 contacts with finger 50 turning shaft 47 in proper direction and through a suitable distance to open the dump stops. The shaft 47 is held in open position by contact of finger 50 with arm 46 until after two cars have been cut out of the trip and fed between the yokes 10 of stops 6 onto the dump. As soon as the second car being fed onto the dump has passed between yokes 10 the stops 6 close. This permits turning of shaft 1 and consequently arm 45 in proper direction to release arm 46 permitting spring 48 to turn shaft 47 and close the dump stops, the closing of these stops taking place shortly before the first loaded car reaches the dump stops and after the second empty car has passed between these stops and the yokes thereof. It will thus be noted that the operation of both sets of stops is controlled by the cars travelling on the approach track and the dump stops are not closed until after the empty cars have passed between the same and the entering loaded cars have passed between the yokes of the approach track stops. In Fig. 9 I have illustrated the parts by shaded lines in the positions which they occupy as the dump approaches loading position. The positions of these parts when the dump has returned to full loaded position is indicated by light lines, and the position of arm 46 after the shaft 1 has been released and shaft 47 has been turned into stop closing position is indicated by dotted lines. The shaded line position of arms 20′ and 45 also indicates the positions of these members after the shaft 1 has been released and turned into stop closing position. While I have illustrated this form of the apparatus as used in connection with the feeder illustrated in Figs. 1 and 2, the arrangement of Fig. 8 can be reversed, that is, the apparatus illustrated on the dump in this figure can be used as a feeder on the approach track and the feeder illustrated in Fig. 1 can be used on the dump. In this case shaft 47 would be extended toward the entrance end of the dump and arm 46 would be placed on this end of the shaft, arm 45 being placed on the adjacent end of shaft 1 and positioned for contact with arm 46 so as to hold the shaft 47 in stop opening position until after the shaft 1 on the dump is released, at which time shaft 47 is released so as to permit closing of the stops connected to this latter shaft. The dump apparatus illustrated in Fig. 8 may also be utilized in conjunction with the dump apparatus illustrated in Fig. 1, either of these apparatuses being used on the approach track and the other on the dump.

In Figs. 10 to 12 I have illustrated a modified form of feeder adapted to be used for feeding cars singly. This feeder includes a

shaft 51 rockably mounted in the bearing blocks 52 between rails *a* of the approach track A. This shaft is connected to the approach track stops 6 in the manner previously described for closing and opening the same. In this instance, these stops are not provided with any yokes. A holding treadle 53 is mounted adjacent one rail *a* and is supported by rods 54 secured to a pintle rod 55 rockably mounted in the bearing blocks 56 secured to the web of the other rail *a*. An arm 57 similar to arm 15 is secured on shaft 51 and is provided with a nose member 58 disposed to engage beneath foot 59 of the treadle. A tension spring 60 is secured at its outer end to rail *a* and has its inner end secured to an arm 61 which is secured on shaft 51, this spring acting to turn the shaft in stop closing direction. A trip arm 62 is secured on the end of shaft 51 adjacent the dump or cage and is disposed for contact by a trip member carried on the dump or cage so as to open the approach track stops 6 upon movement of the dump into loading position. As soon as the stops 6 are open, the front car of the trip, the front wheels of which rest upon the treadle 53, travels by gravity through the stops 6. As soon as the rear wheels of this car pass off of the treadle, shaft 51 is turned by spring 60 into stop closing position, member 58 raising the treadle sufficiently to pass out of contact with foot 59 thereof, after which the treadle is returned to its lowered inoperative position by gravity. The stops 6 close in front of the second car of the trip, this car moving along the approach track until the front wheels thereof contact with stops 6 so as to be positioned above treadle 53. When shaft 51 is again turned in stop opening direction, member 58 passes beneath foot 59 of the treadle and serves to hold the shaft 51 against turning movement into stop closing position when the shaft is released from the trip member on the dump or cage, until the wheels of the car have passed off of the treadle, after which the stops 6 are closed in the manner described. This operation is repeated upon return of the dump or cage to loading position. This apparatus provides simple and efficient means whereby the cars of a trip may be cut out and fed singly onto a dump or cage. As the treadle 53 is positioned closely adjacent the stops 6, the apparatus may be positioned close to the entrance end of the dump thus permitting rapid feeding of the cars onto the dump, which is an important consideration in mining operations. While I have illustrated and described the shaft 51 as automatic in its operation, this shaft can, if desired, be operated manually by means of a lever and associated parts in a known manner for opening the stops, the closing of the stops being automatic in the manner above described.

While I have illustrated and described my several apparatuses as used for feeding cars onto and off of a dump or cage, the several forms of feeders may be used for other purposes as well. In mining and other operations where cars are used on tracks it is known to use feeders for controlling the travel of the cars over the knuckles of inclines, onto transfers, and for other purposes for which my apparatuses can be readily adapted by anyone familiar with such operations. I do not, therefore, limit myself to the use of my feeders in connection with dumps and cages and similar apparatus, but claim the right to use my feeders for all purposes for which such feeders can be used in mining and other operations involving the handling of cars on tracks.

As will be understood, and as indicated herein, changes in construction and arrangement of parts of the invention may be resorted to without departing from the field and scope of the same, and I intend to include all such variations as fall within the scope of the appended claims, in this application in which the preferred forms only of my invention are disclosed.

What I claim is:

1. In combination with an approach track and a dump movable into and out of loading position relative to the track, a rocker shaft on the approach track, stops mounted adjacent the rails of the track for movement toward and away from the same, connections between the stops and the shaft for closing and opening said stops in accordance with rocking of the shaft, means for turning the shaft in stop opening direction as the dump is returned to loading position relative to the track, means urging the shaft in stop closing direction, and a series of devices controlled by cars on the track for holding the shaft in stop opening position, said devices being released to permit rocking of the shaft into stop closing position after a predetermined number of cars has passed beyond the stops.

2. In combination with an approach track and a dump movable into and out of loading position relative to the track, a rocker shaft on the approach track, stops mounted adjacent the rails of the track for movement toward and away from the same, connections between the stops and the shaft for closing and opening said stops in accordance with rocking of the shaft, means for turning the shaft in stop opening direction as the dump is returned to loading position relative to the track, means urging the shaft in stop closing direction, and means controlled by cars on the approach track for holding the shaft in stop opening position,

said holding means being released to permit closing of the stops after a predetermined number of cars has passed beyond the stops.

3. In combination with an approach track and a dump movable into and out of loading position relative to the track, a rocker shaft on the approach track, stops mounted adjacent the rails of the track for movement toward and away from the same, connections between the stops and the shaft for closing and opening said stops in accordance with rocking of the shaft, means for turning the shaft in stop opening direction as the dump is returned to loading position relative to the track, means urging the shaft in stop closing direction, and a series of devices controlled by cars on the approach track for holding the shaft in stop opening position, said devices being successively released during travel of the cars toward the stops to permit rocking of the shaft into stop closing position after a predetermined number of cars has passed beyond the stops.

4. In combination with an approach track and a dump movable into and out of loading position relative to the track, stops on the dump, stops on the approach track, means urging the dump stops closed, means urging the track stops closed, means for opening both sets of stops as the dump returns to loading position, car actuated and controlled means for releasing the dump stops from the opening means therefor and for holding them open during passage of a plurality of cars between said dump stops and then releasing the dump stops and permitting closing thereof, and means for releasing the track stops to permit closing thereof after a predetermined number of cars has passed beyond said track stops.

5. In combination with an approach track and a dump movable into and out of loading position relative to the track, stops on the dump, stops on the approach track, means urging the dump stops closed, means urging the track stops closed, means for opening both sets of stops as the dump returns to loading position, means for releasing the dump stops and permitting closing thereof after a predetermined number of cars have passed between said dump stops, car controlled means for releasing the dump stops from the opening means therefor and for holding them open during passage of a plurality of cars between said dump stops and then releasing the dump stops and permitting closing thereof, and means for releasing the track stops to permit closing thereof after a predetermined number of cars has passed beyond the said track stops.

6. In combination with an approach track and a dump movable into and out of loading position relative to the track, stops on the dump, stops on the approach track, means urging the dump stops closed, means urging the track stops closed, means for opening both sets of stops as the dump returns to loading position, car controlled means for releasing the dump stops to permit closing thereof after a predetermined number of cars has passed between said dump stops, car controlled means for releasing the dump stops from the opening means therefor and for holding them open during passage of a plurality of cars between said dump stops and then releasing the dump stops and permitting closing thereof, and means for releasing the track stops to permit closing thereof after a predetermined number of cars has passed beyond the said track stops.

7. In combination with an approach track and a dump movable into and out of loading position relative to the track, stops on the dump, stops on the approach track, means urging the dump stops closed, means urging the track stops closed, means for opening both sets of stops as the dump returns to loading position, the stops being subsequently released from said opening means, car controlled means for holding the approach track stops open and releasing them to permit them to be closed after a predetermined number of cars has passed between said track stops, and car controlled means for holding the dump stops open and releasing them after a predetermined number of cars has passed beyond said dump stops.

8. In combination with a dump and approach and receiving tracks leading to and from the dump, said dump being movable into and out of loading position relative to the tracks, stops on the dump, stops on the approach track, means for opening all of said stops as the dump is moved into loading position, the stops being subsequently released, means urging the stops in closing direction, means on the approach track for releasing the track stops with a step by step movement, said means being operated successively by cars travelling on the approach track toward the dump and acting to release the approach track stops to permit closing thereof after a predetermined number of cars has passed beyond said approach track stops, and means controlled by the cars travelling in the dump for releasing the dump stops to permit closing thereof after a predetermined number of cars has passed beyond the dump stops.

9. In an apparatus of the character described, a track, stops mounted adjacent the rails of the track and movable into open and closed position relative thereto, a rockably mounted shaft, connections between said shaft and the stops for opening and closing the stops in accordance with rocking of the shaft, means urging the shaft in stop

closing direction, a holding treadle adjacent one of the rails positioned to be held depressed by the wheels of a car adjacent the stop, and means coacting with said treadle for preventing turning of the shaft into full stop closing position when the stops are open and the treadle is held against upward movement, said means releasing the shaft to permit closing of the stops when the treadle is released.

10. In an apparatus of the character described, a track, a shaft rockably mounted on the track, stops mounted on the track and movable into open and closed position relative to the rails of the track, connections between the shaft and the stops for opening and closing the latter in accordance with turning of the shaft, means urging the shaft in stop closing direction, treadles adjacent the track rails and disposed in spaced relation longitudinally thereof, the treadles being spaced apart to be held depressed by the wheels of cars supported upon the track above the stops, means coacting with the treadles when the stops are open and the treadles are held depressed for holding the shaft against turning movement in stop closing direction, said means permitting turning of the shaft in stop closing direction with a step by step movement as the cars pass successively off of the treadles, and means for preventing closing of the stops after the last treadle has been released until after the last one of a predetermined number of cars has passed beyond said stops.

11. In an apparatus of the character described, a track, a shaft rockably mounted on the track, stops mounted adjacent the track rails and movable into open and closed position relative thereto, connections between the stops and the shaft for opening and closing the stops in accordance with turning of the shaft, means urging the shaft in stop closing direction, two treadles mounted on the track above the stops and positioned to be held depressed by the wheels of cars supported on the track above the stops, the treadles being so spaced that the front wheel of a car travelling upon the track will bear upon the treadle nearer the stops before the hind wheel of the same car has left the other treadle, hinged arms secured on the shaft and disposed for engagement beneath the treadles, the arm engaging with the treadle nearer the stops being spaced further around the shaft away from its cooperating treadle that the other arm is spaced from its treadle, and yokes carried by the stops and extending parallel with the rails of the track in a direction away from the treadles, the yokes being disposed for contact with the wheels of a car passing between the same and acting to hold the stops open until the car has passed completely beyond said yokes.

12. In combination with a dump and approach and receiving tracks leading to and from the dump, a shaft rockably mounted on the approach track, stops mounted adjacent the rails of the approach track and movable into open and closed position relative to the rails, connections between the stops and the shaft for opening and closing the stops in accordance with turning of the shaft, means urging the shaft in stop closing direction, a pair of treadles mounted on the track above the stops and so spaced and positioned to be held depressed by the wheels of cars supported on the approach track above the stops, the treadles being so spaced that the front wheels of a car will pass onto the treadle adjacent the stops before the rear wheels of the same car pass off of the other treadle, hinged arms secured to the shaft and disposed for engagement beneath the treadles when the shaft is turned into stop opening position, the arm engaging beneath the inner treadle being spaced further around the shaft away from its cooperating treadle than the arm which engages beneath the outer treadle, yokes carried by the stops and extending parallel with the rails toward the entrance end of the dump, the yokes being disposed for contact with the wheels of a car passing between the stops, a trip arm secured on the inner end of the shaft, and a trip member secured on the dump and disposed for contact with the trip arm for turning the shaft in stop opening direction when the dump is returned to loading position

13. In combination with a dump and approach and receiving tracks leading to and from the dump, a shaft rockably mounted on the dump, a track section on the dump, stops mounted on the dump for movement into open and closed positions relative to the rails of the dump track section, connections between the shaft and the stops for moving the stops into open and closed position in accordance with turning of the shaft, means for turning the shaft into stop opening position upon the return of the dump to loading position, means urging the shaft in stop closing direction, means actuated by an entering car for releasing the shaft from said means for turning the shaft into stop opening position, a treadle mounted adjacent one of the rails and disposed to be held depressed by the wheels of a car on the dump above the stops, a hinged arm secured on the shaft and disposed for engagement beneath the treadle for holding the shaft against turning movement into stop closing position when the treadle is held depressed and the stops are open, and yokes carried by the stops and extending in the direction of the exit end of the dump and in substantial parallelism with the rails of the dump track section.

14. In combination with a dump and approach and receiving tracks leading to and from the dump, the dump being provided

with a track section, stops on the approach track, stops on the dump, means for opening all of said stops when the dump is returned to loading position, means urging the approach track stops in closing direction, means urging the dump stops in closing direction, means for holding the approach track stops open and for releasing said stops after a predetermined number of cars have passed between the same, and means controlled by the means for releasing the approach track stops for releasing the dump stops to permit closing thereof.

15. In combination with a dump and approach and receiving tracks leading to and from said dump, stops on the approach track stops on the dump, means urging the approach track stops in closing direction, means urging the dump stops in closing direction, means for opening all of said stops when the dump returns to loading position, and means for holding all of the stops open and for releasing all of said stops to permit closing thereof after a predetermined number of cars has passed between the approach track stops.

16. In combination with a dump and approach and receiving tracks leading to and from said dump, stops on the approach track, stops on the dump, a shaft on the dump, connections between the shaft and the dump stops for moving the latter into open and closed position in accordance with turning of the shaft, means urging the shaft in stop closing direction, a shaft on the approach track, connections between the approach track shaft and the approach track stops for opening and closing the latter in accordance with turning of the approach track shaft, means urging the approach track shaft in stop closing direction, means for turning the approach track shaft in stop opening direction when the dump is moved into loading position, an arm secured on the dump shaft, an arm secured on the approach track shaft and provided with an element disposed for contact with the arm on the dump shaft, the arms being so related that the dump shaft is turned into stop opening position when the dump is moved into loading position by contact of the element of the approach track shaft arm with the arm of the dump shaft, and means for holding the approach track shaft in stop opening position and releasing it after a predetermined number of cars has passed between the dump track stops to permit closing of all of the stops.

17. In combination with a car dump and approach and receiving tracks leading to and from said dump, the dump being movable into and out of loading position relative to the approach track, stops on the dump, stops on the approach track, means for opening all of said stops and holding them in open position when the dump returns to loading position, means urging the stops in closing direction, and means for releasing the stops to permit closing thereof after a predetermined number of cars has passed between the approach track stops.

18. In combination with a car dump and approach and receiving tracks leading to and from said dump, the dump being movable into and out of loading position relative to the approach track, stops on the dump, stops on the approach track, means for opening all of said stops and holding them in open position when the dump returns to loading position, means urging the stops in closing direction, and car controlled means for releasing the stops to permit closing thereof after a predetermined number of cars has passed between the approach track stops.

19. In combination with a car dump and approach and receiving tracks leading to and from said dump, the dump being movable into and out of loading position relative to the approach track, stops on the dump, stops on the approach track, means controlled by the position of said dump for opening all of said stops and holding them in open position when the dump returns to loading position, means urging the stops in closing direction, and means for releasing the stops to permit closing thereof after a predetermined number of cars has passed between the approach track stops.

20. In combination with a car dump and approach and receiving tracks leading to and from said dump, the dump being movable into and out of loading position relative to the approach track, stops on the dump, stops on the approach track, dump actuated means for opening all of said stops and holding them in open position when the dump returns to loading position, means urging the stops in closing direction, and means for releasing the stops to permit closing thereof after a predetermined number of cars has passed between the approach track stops.

21. In combination with a car dump and approach and receiving tracks leading to and from said dump, the dump being movable into and out of loading position relative to the approach track, stops on the dump, stops on the approach track, dump actuated means for opening all of said stops and holding them in open position when the dump returns to loading position, means urging the stops in closing direction, and car controlled means for releasing the stops to permit closing thereof after a predetermined number of cars has passed between the approach track stops.

22. In a feeder, a track, stops mounted adjacent the track rails and movable into open and closed positions relative thereto, means urging the stops in closing direction,

and car controlled means for holding the stops against closing until a predetermined number of cars has passed beyond the stops and then releasing the stops to permit closing thereof.

23. In a feeder, a track, stops mounted adjacent the track rails and movable into open and closed positions relative thereto, means urging the stops in closing direction, a member held against movement in stop releasing direction by a car on the track in operative relation to said member, and means cooperating with said member for holding the stops against movement in closing direction, said member being released to permit movement of the stops in closing direction after the car has moved out of operative relation to said member.

24. In an apparatus of the character described, a track, a shaft rockably mounted on the track, stops mounted on the track and movable into opened and closed position relative to the track rails, connections between the shaft and the stops for opening and closing the latter in accordance with turning of the shaft, means urging the shaft in stop closing direction, treadles adjacent the track rails and disposed in spaced relation longitudinally thereof, the treadles being spaced apart to be held depressed by the wheels of a car supported upon the track above the stops, means coacting with the treadles when the stops are open and the treadles are held depressed for holding the shaft against turning movement in stop closing direction, said means permitting turning of the shaft in stop closing direction with a step by step movement as the cars pass successively off of the treadle, and means for preventing closing of the stops after the last treadle has been released until after the last one of a predetermined number of cars has passed beyond the stops, the car holding means being adjustable to optionally eliminate one step in the stop closing movement of the shaft.

25. In an apparatus of the character described, a track, stops associated with the track and movable into and out of position to hold a car on the track, and means for moving the stops out of operative position and then moving them into operative position after a predetermined number of cars has passed beyond the stops, said means being adjustable to adapt the apparatus for handling different numbers of cars.

In testimony whereof I affix my signature.

NELLIE L. HARMON.