United States Patent [19]

Swartz

[11] **3,726,233**

[45] **Apr. 10, 1973**

[54] **REAR TROLLEY DOG FOR POWER AND FREE PUSH THROUGH TRANSFER**

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[73] Assignee: **FMC Corporation,** San Jose, Calif.

[22] Filed: **Apr. 5, 1971**

[21] Appl. No.: **131,332**

[52] **U.S. Cl.**.....**104/172 S,** 104/96

[51] **Int. Cl.**.....**B61b 9/00,** E01b 25/26

[58] **Field of Search**.....104/172 S, 96

[56] **References Cited**

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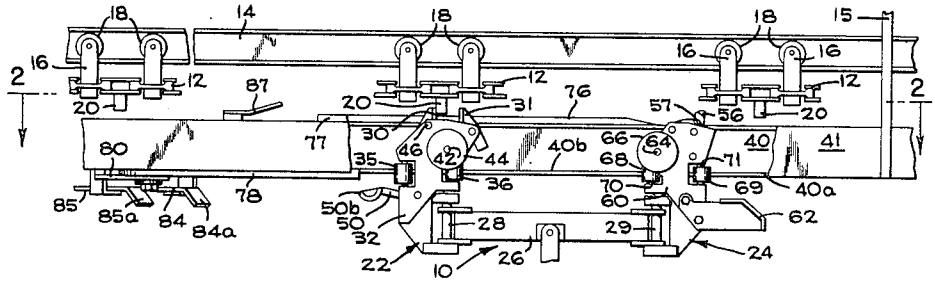
Attorney—F. W. Anderson and C. E. Tripp

[57] **ABSTRACT**

A conveyor trolley for use in a conveyor system of the type referred to as "power-and-free systems" is provided with a driving pawl at its forward end and with means for lowering the pawl as the trolley is moved through a transfer station from a powered main line to a powered secondary storage or processing line. The trolley is also provided at its rearward end with an upright dog which normally pivots to inoperative position when struck by a forwardly-moving pusher. The dog is locked in an upright operating position in the path of the pushers of the main line only at the transfer station. This occurs when the driving pawl on the front of the trolley has been diverted onto a secondary line and moved out of contact with the pusher on the main line. The next following pusher on the main line will engage the raised dog and positively move the trolley through the transfer station and onto the secondary line.

6 Claims, 17 Drawing Figures



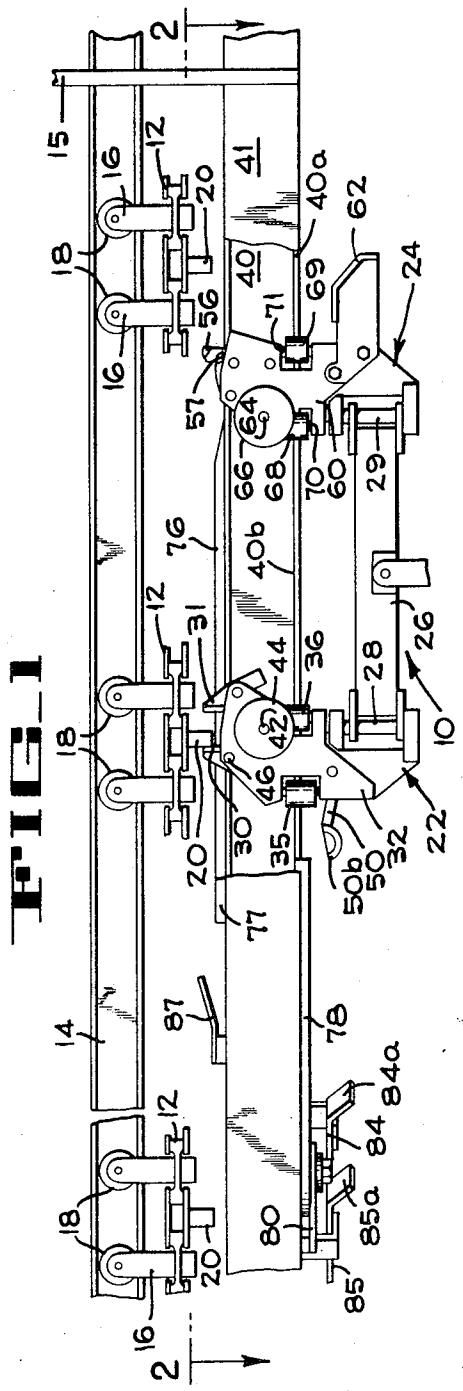


FIG. 1

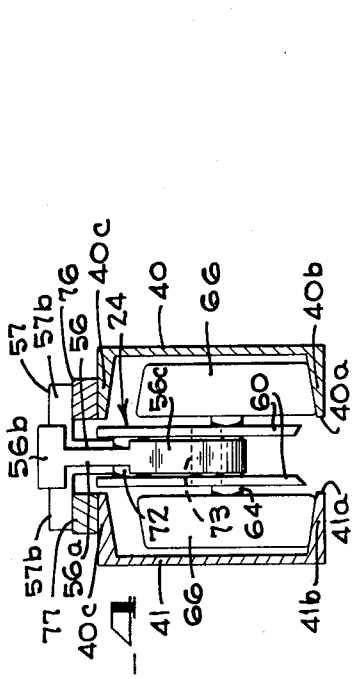


FIG. 4

FIG. 2

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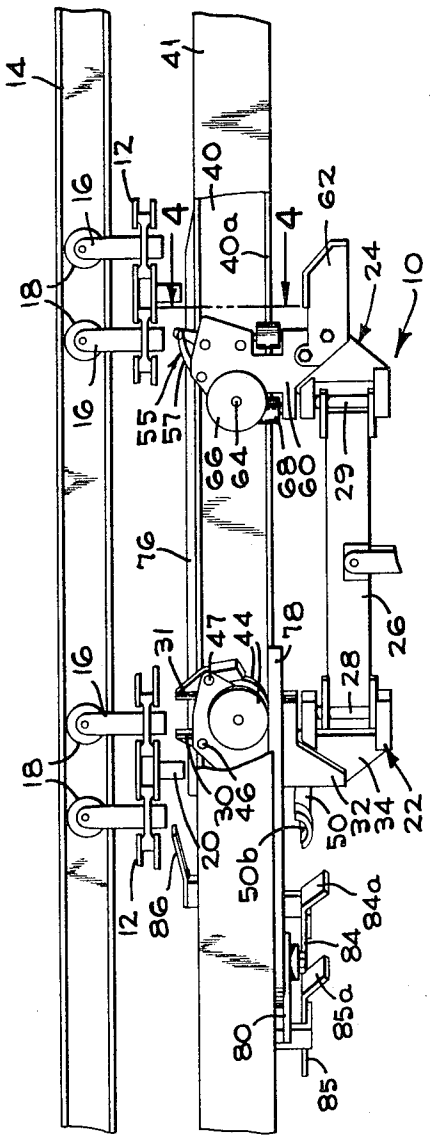

FIG. 3

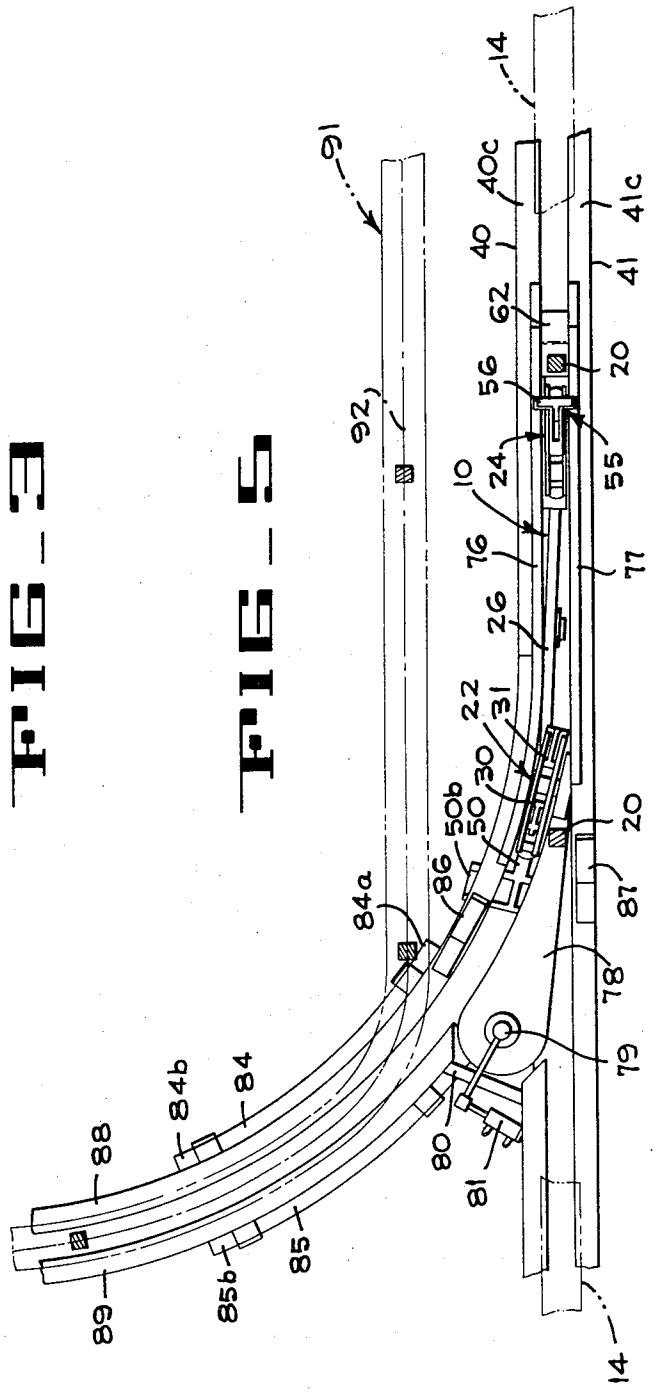

FIG. 5

FIG_6

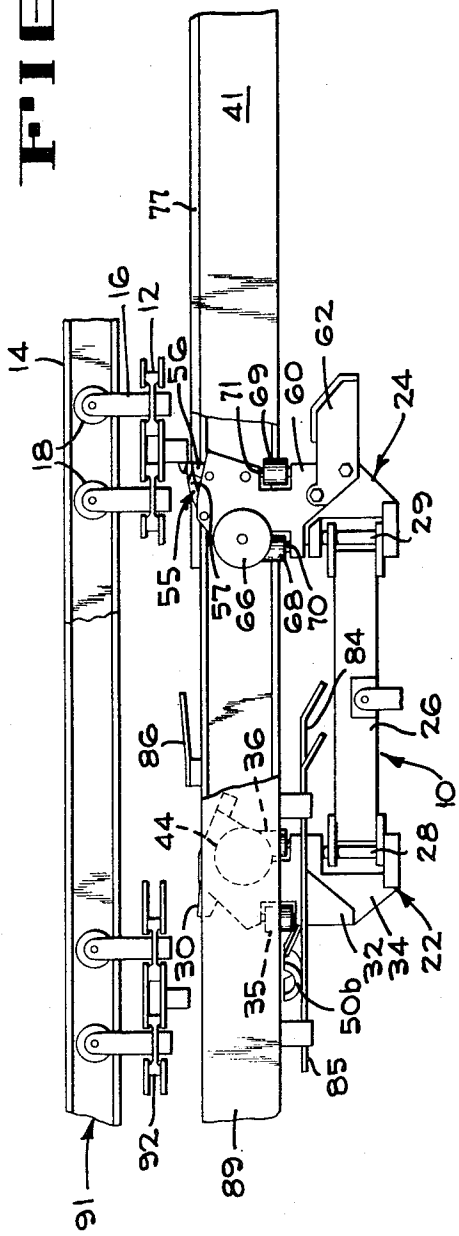
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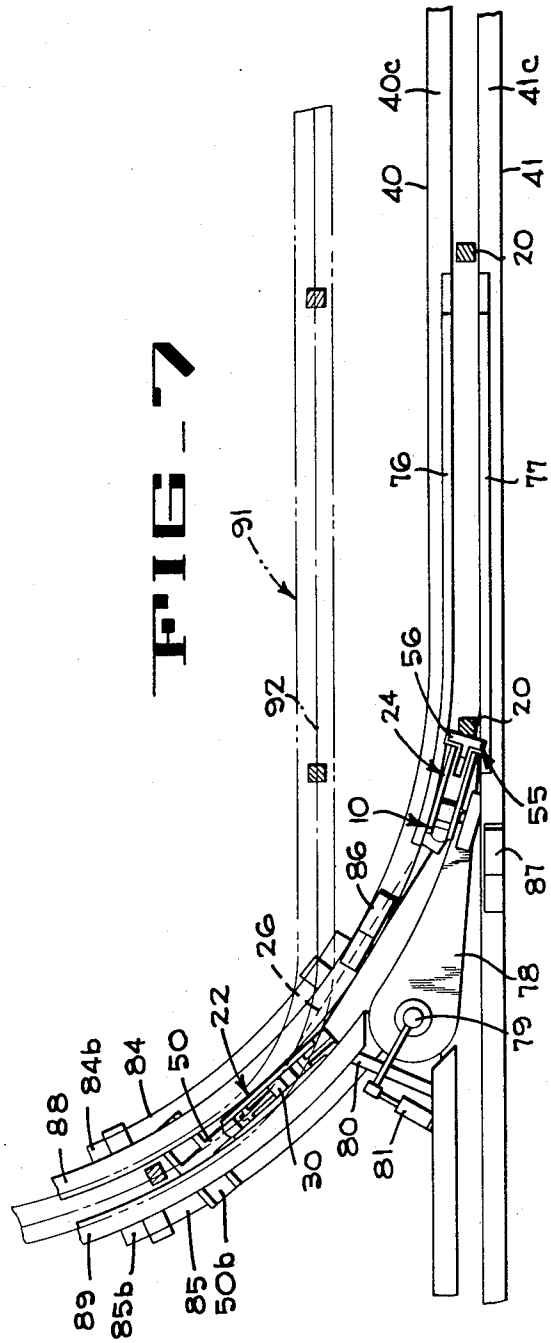
FIG_7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85b
85
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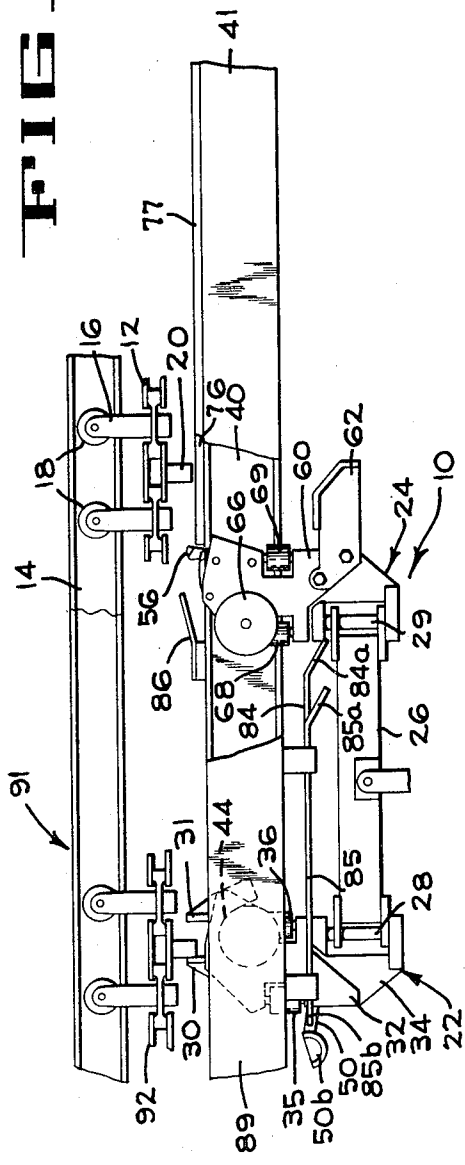
FIG_8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84a
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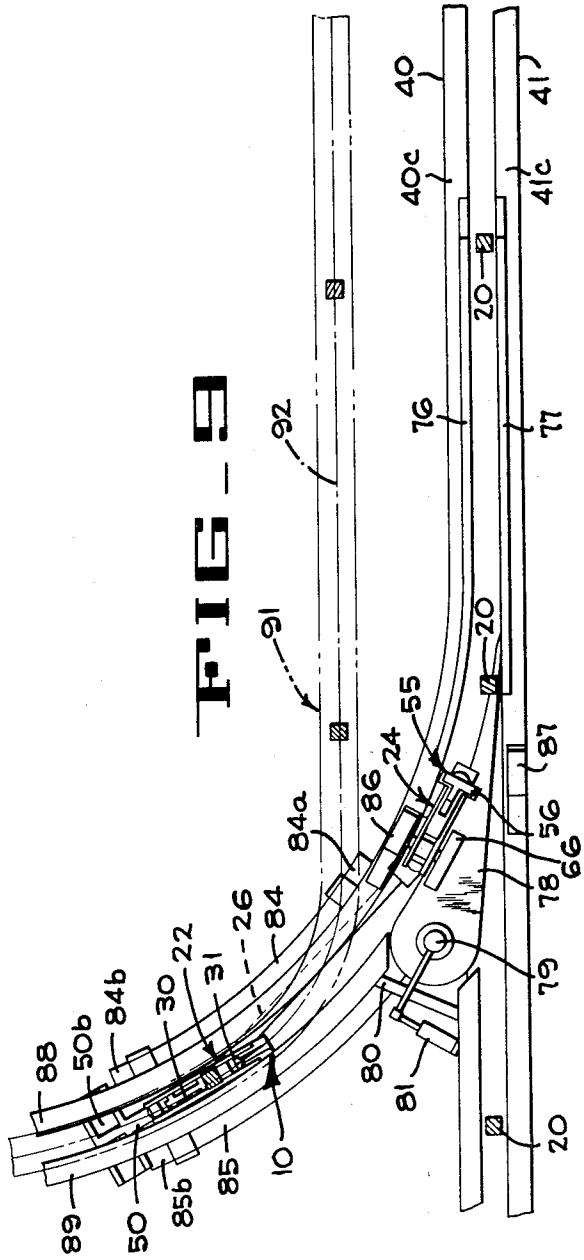
85b
92
89
35
50b

FIG_9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92
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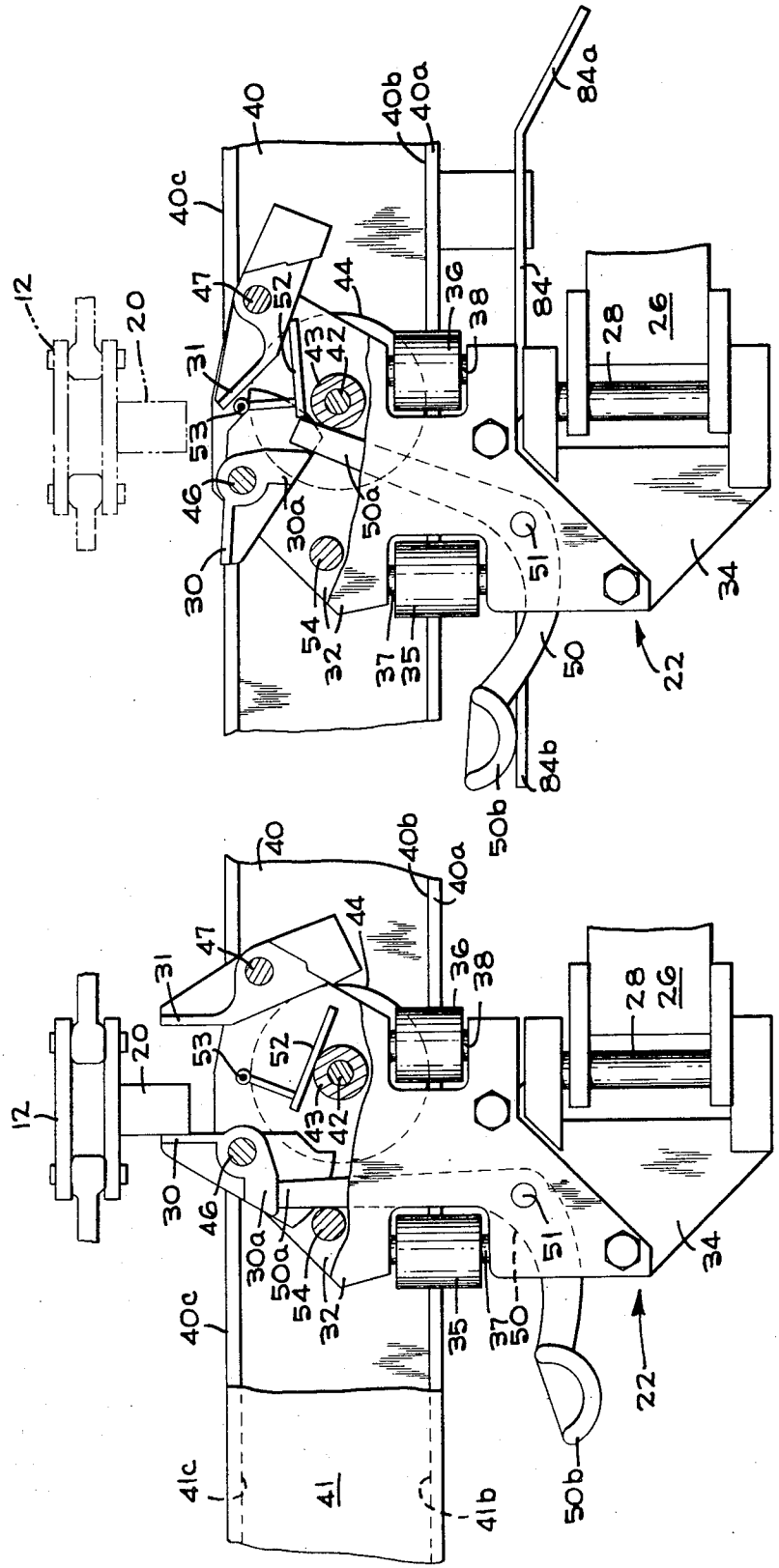
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30a
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50b
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41c
41b

FIG_11

FIG_10

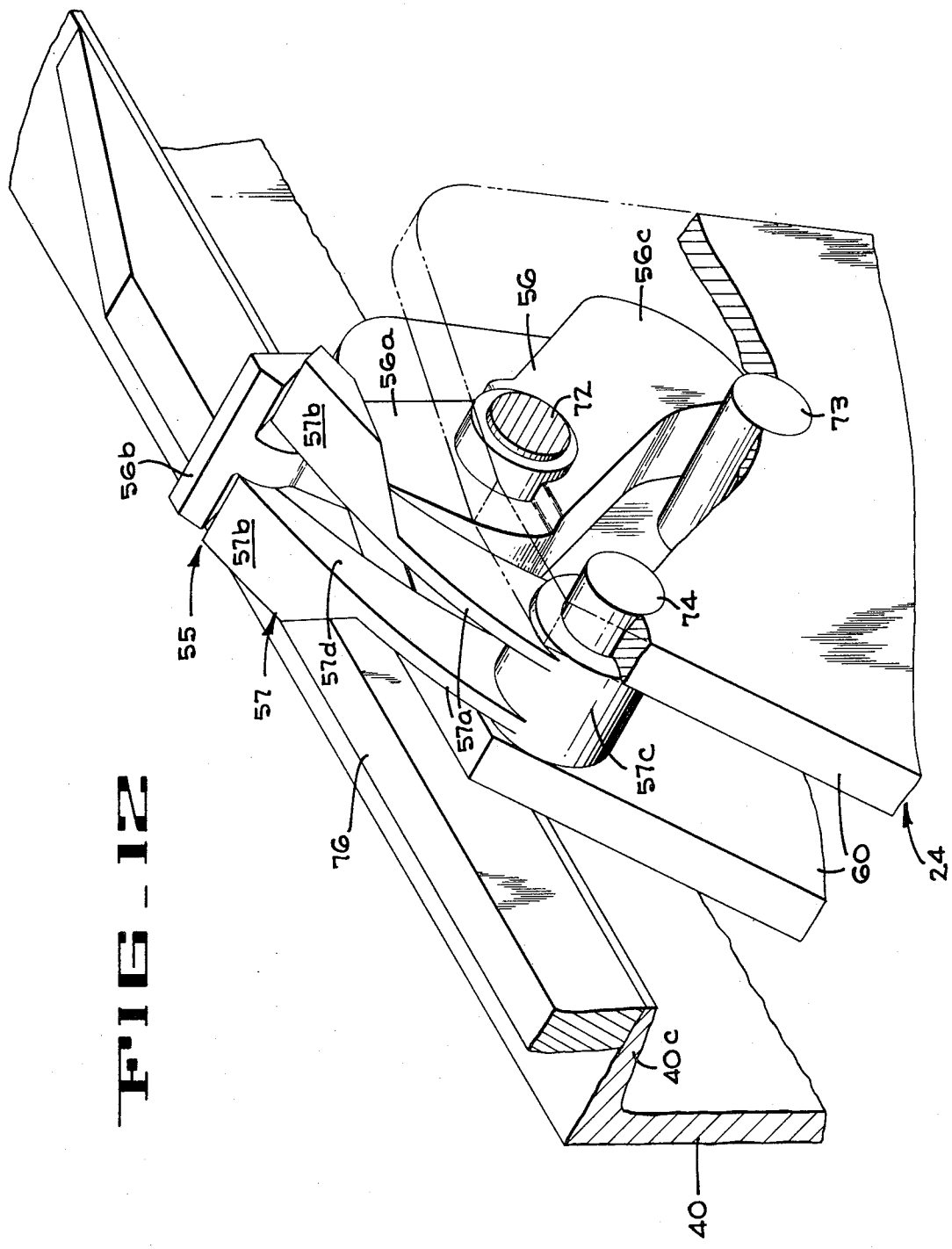
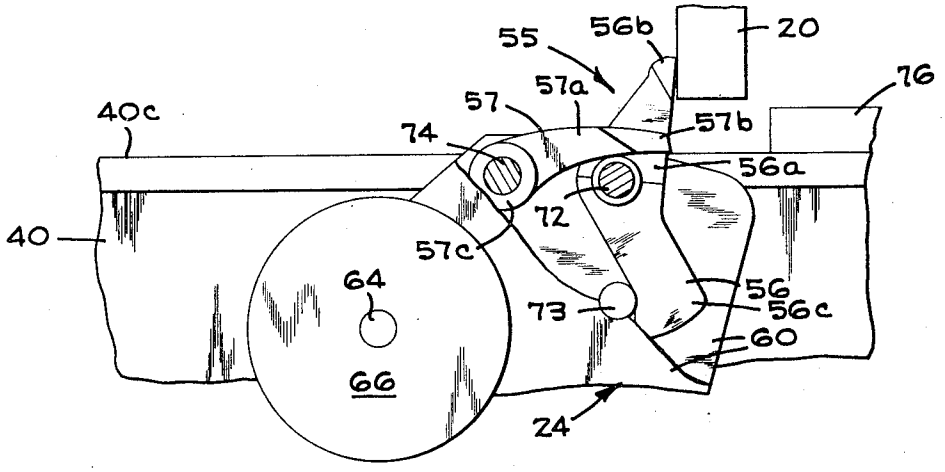


FIG - 12

FIG_13



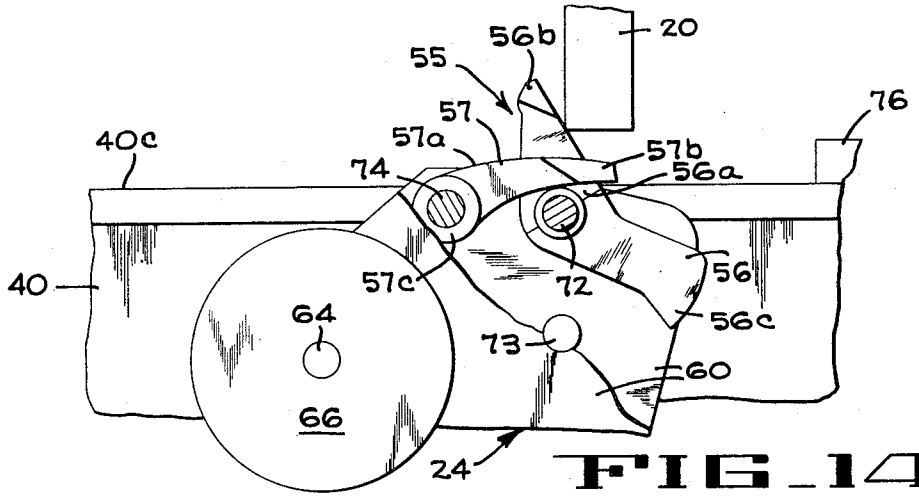


FIG_14

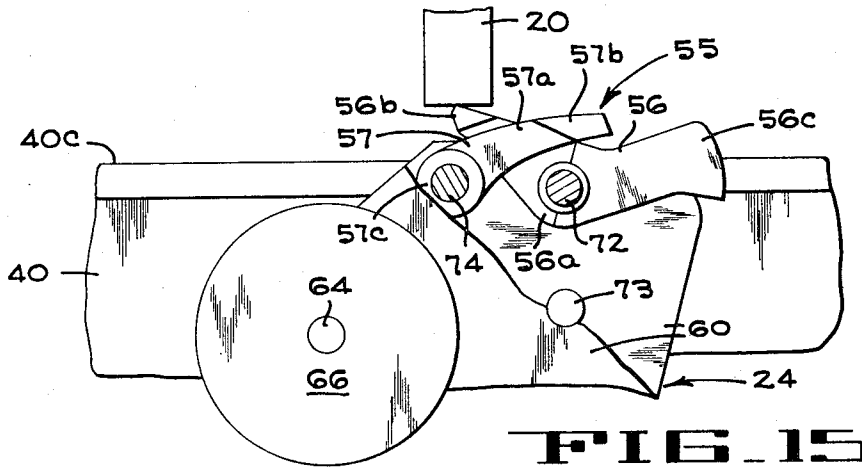
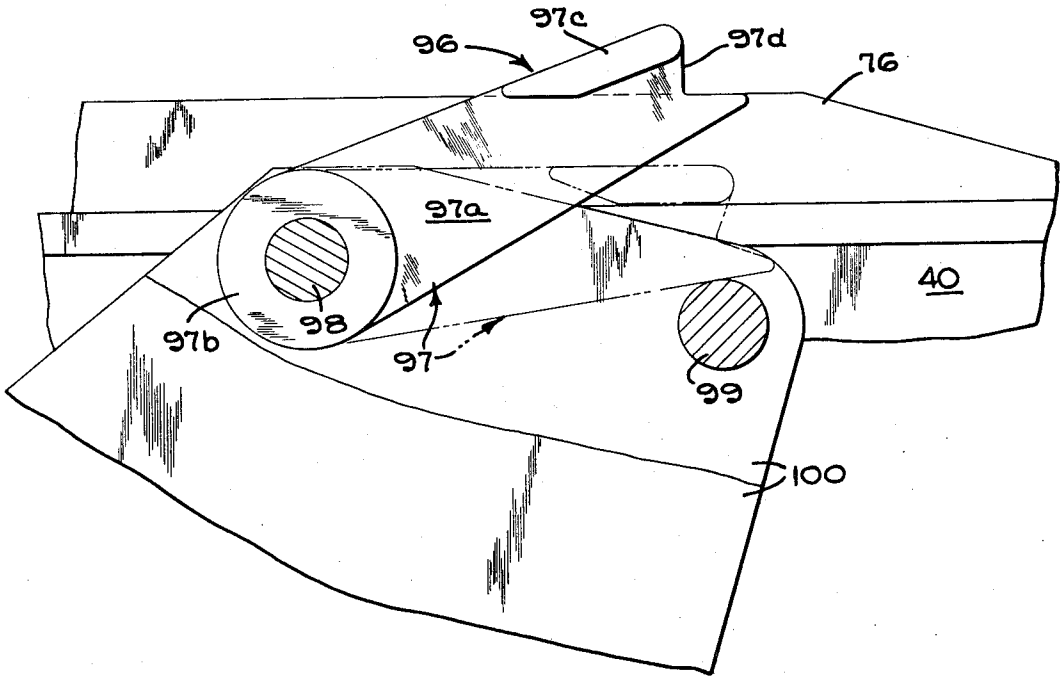


FIG_15

FIG_16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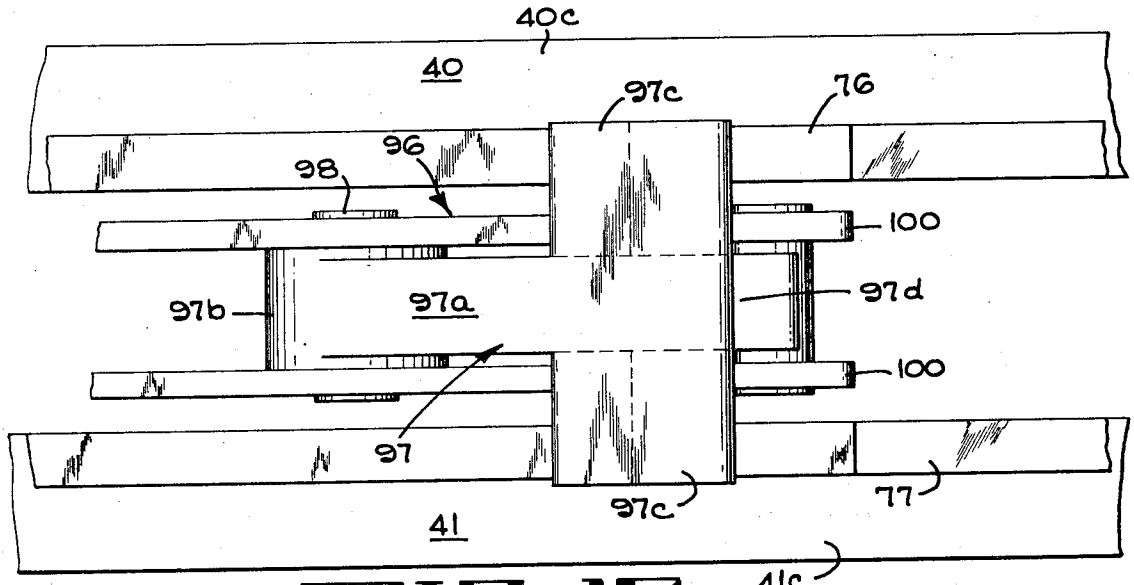
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FIG_17

REAR TROLLEY DOG FOR POWER AND FREE PUSH THROUGH TRANSFER

BACKGROUND OF THE INVENTION

One type of trolley or carrier of a power-and-free conveyor system is provided with a pawl projecting upwardly at its forward end so that the pusher on a powered overhead chain can engage the pawl and propel it along the main conveyor line. When transferring such a trolley from the main line to a secondary storage or processing line, some means must be provided to propel the trolley from a first position in the transfer station at which the pusher on the main line chain moves out of contact with the pawl on the trolley, to a second position at which the pawl is in the path of movement of a pusher on the powered chain of the secondary line. Means for moving the trolley from the first position to the second position have been provided in the past in the form of separately powered sweep arms and separately powered chains. Also there has been used an arrangement wherein secondary pushers are provided on the powered chain of the main line. One of these pushers is spaced rearwardly from each primary pusher and is so constructed as to extend downwardly from the chain a shorter distance than the primary pusher. At each transfer station the I-beam track that carries the powered chain is inclined downwardly so that the shorter secondary pusher will engage a pawl on the rear of any trolley that is temporarily stopped at the transfer station, due to the fact that the front of the trolley has been diverted into a secondary line out of contact with the primary pusher, and push the stalled trolley to the second position. U.S. Pat. Nos. 3,179,064, 3,222,645, 3,247,806 and 3,314,377 disclose transfer mechanisms of this general type.

Accordingly, it is an object of the present invention to provide an improved mechanism for positively transferring a trolley from one conveyor line to another.

SUMMARY OF THE INVENTION

The present invention relates to conveyors and more particularly to improvement in trolleys of a power-and-free conveying system of the type wherein the trolley has an upwardly projecting pawl at its forward end that is adapted to be engaged by a depending pusher of an overhead powered chain. When the trolley of this type is diverted from the main line to a secondary line, the pawl at the front of the trolley moves out of engagement with the pusher of the main line, leaving the trolley momentarily stopped. In the present invention, an upright dog, which is in normal operation capable of being deflected by the forward movement of a pusher from the overhead powered chain, is mounted on the rearward portion of the trolley, and cam means is provided alongside the path of movement at the transfer zone to engage and lock the dog in the upright position. Then, if the forward end of the trolley has been diverted onto a secondary line by means of a switching arrangement, the next pusher of the powered chain of the main line will engage the locked dog on the trolley and positively push the trolley off the main line and onto the secondary line.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a fragmentary side elevation, with parts broken away, showing a trolley constructed in accordance with the present invention as it approaches a transfer station of a power-and-free conveyor system.

FIG. **2** is a horizontal section taken on line **2—2** of FIG. **1**, showing the transfer station and the secondary conveyor line leading away from the main line.

FIG. **3** is a side elevation similar to FIG. **1**, but showing the trolley as it has advanced into the transfer station.

FIG. **4** is an enlarged vertical section taken on line **4—4** of FIG. **3**.

FIG. **5** is a plan view corresponding to the side elevation of FIG. **3**.

FIG. **6** is a side elevation similar to FIG. **3** but showing the trolley advanced further into the transfer zone.

FIG. **7** is a plan view corresponding to the side elevation of FIG. **6**.

FIG. **8** is a side elevation similar to FIG. **6** but showing the trolley advanced to the end of the transfer zone.

FIG. **9** is a plan view corresponding to the side elevation of FIG. **8**.

FIG. **10** is a side elevation of the front portion of the trolley, showing a pusher in engagement with the driving pawl.

FIG. **11** is a view similar to FIG. **10** but showing the driving pawl and the backup pawl in their inoperative positions.

FIG. **12** is a fragmentary isometric of the rear carriage of the trolley as viewed obliquely from the front of the carriage.

FIGS. **13**, **14** and **15** are fragmentary side elevations displaying the action of a pusher moving over an unlocked rear dog.

FIG. **16** is a side elevation of the rear carriage, displaying a pivotally mounted rear dog mechanism of another embodiment of the invention.

FIG. **17** is a top plan view of the rear carriage of FIG. **16**.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In FIG. **1**, the reference numeral **10** indicates generally a trolley of the type used in a power-and-free conveying system which, in general, includes a powered chain **12** that is supported by spaced brackets **16** from an overhead I-beam **14** secured to depending hangers **15**. Each bracket **16** is secured at its lower end to the chain **12**, and its upper end has two rollers **18**, one roller being disposed on each side of the web of the I-beam **14** in rolling engagement with the top surface of the lower flange of the I-beam. Pusher pins **20** are secured to the powered chain **12** at spaced intervals and project downwardly therefrom to engage a drive pawl **30** carried at the forward end of each trolley **10** and thus propel the trolley.

The trolley **10** comprises a forward carriage **22** and a trailing carriage **24** that are connected by a load support bar **26**. The load support bar is pivotally connected by pin **28** to carriage **22** and by pin **29** to carriage **24**. Referring to FIGS. **10** and **11**, the forward carriage includes a pair spaced vertical plates **32** that are secured together by bolts extending through the

base 34. Fore and aft guide rollers, 35 and 36 respectively, are mounted for rotation about the vertical pins 37 and 38 that are supported in blocks disposed between the plates 32. The guide rollers 35 and 36 are disposed in the guide slot defined by the inner edges 40*a*, 41*a*, of the lower flanges 40*b*, 41*b* of two oppositely facing channels 40 and 41, respectively, secured to hanger 15. The two channels 40 and 41 support the trolley 10 and the load carried thereby. A pin 42 extends transversely across the carriage 22 and through a bushing 43 disposed between the side plates 32. The shaft 42 extends through the side plates, and on the outer faces of each side plate, a roller 44 is mounted on the shaft 42 for rolling engagement with the upper surface of one of the inturned lower flanges 40*b*, 41*b* of the channels 40 and 41.

Referring to FIG. 10, it will be seen that the drive pawl 30 is pivotally mounted on a pin 46 that extends between and is fixed to the side plates 32. A ledge 30*a* is integrally formed on the pawl and has an undersurface arranged to be engaged by the end surface of an upwardly projecting arm 50*a* of an actuating bellcrank 50. The bellcrank 50 is pivoted on a pin 51, so that the pawl is held in the drive position of FIG. 10. The weight of the pawl is so distributed that, when the bellcrank 50 is swung clockwise to the position of FIG. 11, the pawl 30 will rotate by gravity to the non-driving position of FIG. 11. A backstop pawl 31 is pivotally mounted on a pin 47 that extends between the plates 32 rearwardly of the pawl 30. The pawl 31 has a weight distribution which normally holds the pawl in the upright position shown in FIG. 10. An intermediate lever 52 is pivotally mounted on a transverse pin 53 which is intermediate the pawls 30 and 31. In one position lever 52 (FIG. 10) provides a positive stop against clockwise rotation of backstop pawl 31. When the actuating bellcrank 50 moves to the position of FIG. 11, it engages the intermediate lever 52 and swings it counterclockwise to a second position (FIG. 11) into engagement with the backstop pawl 31. Accordingly, the pawl 31 is swung counterclockwise to the lowered position of FIG. 11. Thus backstop pawl 31, which in the upright position of FIG. 10 restrains trolley 10 from moving ahead of pusher member 20, is lowered out of the path of pushers 20 (FIG. 11) for diversion onto a secondary line.

It is desirable that the pawls 30 and 31 be swung to their lowered position (FIG. 11) as the trolley moves onto the secondary line so that, if a pusher of the powered chain 92 of the secondary line should be in the path of the forward end 22 of the trolley 10, the pawls 30 and 31 will pass there under without colliding with the pusher. In order to lower the pawls 30 and 31 during this interval, two cam plates 84 and 85 (FIGS. 1 and 2) are secured in fixed position along the secondary line, one on each side of the path of movement of the trolley 10. The plate 84 extends from its leading edge 84*a* to a trailing edge 84*b*, while plate 85 extends from edge 85*a* to edge 85*b*. The bellcrank 50 is provided at the forward end of trolley 10 with a transverse bar 50*b* that has a rounded leading edge (FIG. 9) which is adapted to ride up the leading edges of the cam plates 84 and 85. The bar 50*b* also acts as a counterweight to urge the bellcrank 50 counterclockwise (FIG. 10) to a position wherein its upwardly projecting arm 50*a* abuts a fixed transverse stop pin 54.

The action of the bellcrank 50 in effecting the lowering of the pawls 30 and 31 is illustrated in FIG. 11. In this view it is seen that the cam plates 84 and 85 (only the cam plate 84 being shown), which are in the same horizontal plane, are spaced below the channels 40 and 41. As the transverse bar 50*b* of bellcrank 50 rides up onto the cam plates 84 and 85, the bellcrank 50 is pivoted clockwise from its normal counterweighted position, releasing the ledge 30*a* of the drive pawl 30 to permit the pawl 30 to swing counterclockwise by gravity to its lowered position. During its pivoting movement, the bellcrank arm 50*a* engages the intermediate lever 52 and swings it into engagement with the backstop pawl 31 to pivot that pawl 31 to its lowered position (FIG. 11).

The pawls 30 and 31 will remain in their lowered positions until the bar 50*b* of the bellcrank 50 rides off the cam plates 84 and 85 at the trailing edges 84*b* and 85*b*. When this occurs, the bellcrank 50 swings counterclockwise to engage the ledge 30*a* and swing the drive pawl 30 to drive position (FIG. 10). When the bellcrank releases the intermediate lever 52, it swings by gravity to an at rest position against the bushing 43, permitting the backstop pawl 31 to swing clockwise by gravity to its raised position (FIG. 10). The drive and backstop pawl actuating mechanism of FIGS. 10 and 11 is similar to mechanism disclosed in the copending U.S. Pat. application of Horace M. Swartz, U.S. Ser. No. 796,676 filed Feb. 5, 1969 now U.S. Pat. No. 3,602,148.

The trailing carriage 24 (FIGS. 1, 4 and 12) comprises a pair of vertical plates 60 that are secured together in spaced relationship by bolts extending through the tail member 62. A pin 64 which extends transversely through the plates 60 is journaled therein for rotation and carries a pair of rollers 66 that ride on the lower flanges 40*b* and 41*b* of the channels 40 and 41. A pair of fore and aft guide rollers 68 and 69 are mounted for rotation about the vertical pins 70 and 71 that are supported in blocks disposed between the plates 60. The pins 70 and 71 are positioned in the longitudinal central plane of the carriage 24. The guide rollers 68 and 69 are disposed in the guide slot defined by the inner edges 40*a*, 41*a* of the lower flanges 40*b* and 41*b* of the two oppositely facing channels 40 and 41.

The downstream edges 84*b* and 85*b* of the cam plates are so located that the drive pawl 30 of the forward carriage 22 will be allowed to move to its elevated position before the pusher 20 on the main line chain moves out of engagement with locked upright dog 56 on the trailing carriage 24 (FIGS. 7 and 9). Thus, when the transferring movement of the trolley 10 under the control of the main chain 12 terminates, the drive pawl 30 is disposed in the path of a pusher on the powered chain 92 of the secondary line. As the powered pusher 92 of the secondary line 91 overtakes the forward carriage 22, the backstop pawl 31 will be pivoted in a counterclockwise direction (FIGS. 7 and 11) by the pusher 92 to allow the pusher to engage the drive pawl 30, thereby driving the trolley 10 along the secondary line 91.

During periods of transfer, the trolley 10 is driven from the rear. A rear pusher dog 56 (FIGS. 3, 4 and 12) on the rear carriage 24 is locked in an upright position in the path of the overhead pushers. The rear dog

mechanism 55 is composed of two main parts, the rear pusher dog 56 which is pivotally mounted on the pin 72, and the forward locking cam 57 which locks the dog 56 in an upright position (FIG. 12) during transfer from one line to a second line. As viewed from the rear of the carriage 24, (FIG. 4) the rear pusher dog 56 presents a T-shape conformation with a transverse bar 56*b* and with a shank portion 56*a* extending down between the plates 60. The portion of the shank above the pin 72 is narrower than that portion below the pin 72 as it is slidable in a slot 57*d* in the locking cam 57. The rear portion of the transverse bar 56*b* (FIG. 12) which forms the top of the T presents a surface for engagement with the pusher 20 of the powered chain, while the front surface of the bar 56*b* is inclined for engagement with the forward locking cam 57. As viewed from the side (FIG. 12), the rear pusher dog 56 has a counterweight portion 56*c* below the pin 72 which is designed to counterbalance the upper section of the dog 56 so that the rear face of the transverse bar 56*b* remains in a vertical orientation except when the unlocked dog is upset by a forward moving pusher of the powered chain. The pin 73 impedes rotation of the dog 56 in a rearward or clockwise direction as shown in FIG. 12.

The rear pusher dog 56 is locked in its upright position (FIG. 12) by the forward locking cam 57 during transfer (FIGS. 3 and 5). The forward locking cam 57 is pivotally mounted between the plates 60 for rotation about the horizontal shaft 74. The parallel arms 57*a* of the locking cam 57 extend from the hub 57*c* to the tabs 57*b* and form the slot 57*d* between the tabs and arms. Clearance for movement of the locking cam 57 relative to the upper portion of the shank 56*a* of the rear pusher dog 56 is provided by the slot. The tips of the tabs 57b are inclined for engagement with the front face of the transverse bar 56*b* of the dog 56. The undersides of the tabs are inclined for engagement with the lifting cams 76 and 77 (FIG. 4) which are installed on the upper flanges 40*c* and 41*c* of the channels 40 and 41 at the transfer zone.

Referring to FIG. 2, it will be noted that the trolley 10 is approaching the transfer zone at which switch plate 78 is mounted for pivoting movement about a vertical post 79 that is supported on a fixed bracket 80. As seen in FIG. 1, the plate 78 has an upper portion disposed in a horizontal plane of the lower flanges 40*b* and 41*b* of the channels 40 and 41 that define the main conveyor line. It will be noted in FIG. 2 that the channel 40 is interrupted for a short distance at the transfer zone to accomodate the switch plate 78 and to permit a curved channel 88 to be secured to channel 40 to form a continuation thereof. The curved channel 88 cooperates with the correspondingly curved channel 89 to define a shunt or secondary powered conveyor line 91. The switch plate 78 is pivoted by a remotely controlled pneumatic power cylinder 81 and when it is in the position shown in FIG. 2, the edge portion 78*b* of the switch plate 78 cooperates with the lower edge of the channel 88 to support the trolley 10 as it moves into the shunt line 91. Similarly, when the switch plate is pivoted counterclockwise to the phantom line position, the edge portion 78*a* of the plate cooperates with the flange 41*b* to support the trolley as it moves straight through the transfer zone on the main line.

When the front portion 22 of the trolley 10 is diverted off the main line at the transfer zone, a pusher pin 20 on the main line power chain 12 moves out of engagement with the drive pawl 30 of the front carriage 22 of the trolley 10 as shown in FIGS. 3 and 5. To prevent the stalling of the trolley when it is partially diverted, a pair of lift cams 76 and 77 are secured to the upper surface of the channels 40 and 41 adjacent the entry to the transfer station. The rear locking cam 57 is lifted into an operative position as it passes over the lift cams 76 and 77, locking rear pusher dog 56 in an upright position. After the pusher pin has moved out of engagement with the front pawls, FIGS. 3 and 5, the next following pusher pin of the main line powered chain advances a short distance into engagement with the rear pusher dog 56. The pusher then urges the trolley through the position shown in FIGS. 6 and 7 and forward to a point (FIGS. 8 and 9) at which the locking cam is disengaged from the lifting cam 76 and the unlocked rear pusher dog 56 is out of the path of the pushers of the main line chain. Simultaneously, with the disengagement of the locking cam 57, the lever 50*b* on the front carriage of the trolley has moved off of the cams 84 and 85 (FIGS. 8 and 9) and the pawl 30 of the front carriage is again in an upright position ready to be engaged by a pusher of the secondary line. Since the locking cam 57 must be in an unlocked or lowered position when the trolley leaves the transfer station, a cam 86 (FIG. 1) is positioned on the upper surface of channel 88 and is provided with a downwardly inclined surface arranged to engage the upper surface of a tab 57*b* of the locking cam 57 and urge the cam to its lowered position, thus insuring that the rear dog is in an unlocked condition. A similar cam 87 substantially identical to cam 86 is mounted on channel 41 to lower the locking cam when the trolley travels straight through the transfer station on the main line.

The sequence of FIGS. 13, 14 and 15 illustrates how the dog 56 is swung out of the path of the forward moving pushers of the powered chain when the locking cam is inoperable as it is only when the trolley is away from the transfer station. In FIG. 13 the dog 56 is shown in its normal upright position with the locking cam 57 disengaged and a pusher 20 of the powered chain just coming into contact with the rear surface of the dog. In FIG. 14 the pusher 20 has just begun to upset the dog 56 which rotates counterclockwise in the slot between the arms 57*a* of the locking cam 57. In FIG. 15 the dog 56 has been rotated to a position out of the path of the pushers of the powered chain and pusher 20 moves over the dog 56 prior to engaging the forward pawl.

Considering that the transfer zones are not always level, the trolley might roll further into the secondary line than illustrated in FIG. 9. Under these circumstances, a situation might occur where a pusher from the secondary line is in front of the front pawl 30 of the front carriage, and the following pusher on the secondary line is behind the rear pusher dog 56. In such a situation, the rear pusher dog 56 is in the unlocked condition and a pusher 92 from the secondary line will engage the rear pusher dog 56 and rotate it counterclockwise (exactly as shown in FIGS. 13, 14 and 15) out of the path of the pusher 92. The pusher 92 will then advance to the forward carriage 22, pushing the rear pawl 31 out of its path and positively engaging the

front pawl **30** to drive the trolley **10** on the secondary line **91**.

The design of the rear pusher dog **56** is such that it adds an extra safety feature to the trolley **10**, by providing a means, in addition to the backup pawl **31**, of stopping a runaway trolley. Since the tracks upon which the trolleys are used in operation are sometimes inclined so that the trolley is moving downhill, should the backup pawl **31** on the front carriage **22** break, the rear pusher dog **56** provides a secondary means of catching the pusher of the powered chain, as the rear pusher dog **56** cannot rotate in a rearward direction because of the pin **73** (FIG. **12**) placed in the path of clockwise rotation.

It might occur that the trolley **10** moves into the secondary line and the secondary line pusher **92** is in front of the pawls of the front carriage by some distance. If the following pusher is in front of the rear pusher dog **56**, and the trolley is moving downhill at a faster speed than the pusher **92** of the secondary line **91**, the front face of the rear pusher dog **56** would engage the rear face of the pusher **92**, thus slowing the speed of the trolley to the speed of the powered chain of the secondary line until the trolley reaches a point at which it will stop. The pusher will then advance to the forward carriage and engage the front pawls and begin driving the trolley **10** on the secondary line **91**.

A further embodiment of the invention contemplates a trolley which includes the same forward carriage **22** described above (FIGS. **10** and **11**), but with a modified dog mechanism **96** (FIG. **16**) incorporated into a rear carriage similar to the carriage **24**. The modified mechanism **96** is composed of a single-piece dog **97** pivotally mounted between the plates **100** for rotation about the shaft **98**. A shank portion **97***a* extends from the hub **97***b* between the plates terminating in the stepped section **97***d*. The tabs **97***c* extend from the top of the shank portion **97***a* and overlie the upper flanges **40***c* and **41***c* of the channels **40** and **41**, as shown in FIG. **17**. The undersides of the tabs **97***c* are inclined for engagement with the lifting cams **76** and **77** which are positioned atop the upper flanges **40***a* and **41***a* of the channels **40** and **41** at the transfer stations.

During normal operation, the dog **97** is in its lowered position (shown in phantom lines in FIG. **16**) with the rearward tip of the shank **97***a* resting on the shaft **99**. During periods of transfer, however, the tabs **97***c* of the dog **97** ride up onto the cams **76** and **77**, thus raising the dog into a position in the line of travel of the forwardly moving pushers of the powered chain. The trolley is then engaged by a forward moving pusher depending from the powered chain and pushed off of the main line onto a secondary line as described in a prior embodiment.

Although the best mode contemplated for carrying out the present invention has been herein shown and described, it will be apparent that modification and variation may be made without departing from what is regarded to be the subject matter of the invention.

What is claimed is:

1. In a conveying system having a trolley movable from a main line into a secondary line at a transfer zone, said conveying system having a series of spaced pusher members and said trolley having a contact member for engagement by a pusher member for propelling the trolley, the improvement comprising a normally upright dog on the trolley behind the contact member, a locking element on the trolley to lock the dog in the upright position when the locking element is in locking position, a cam in the transfer zone for movement of said locking element into locking position, said trolley being pushed through the transfer station by a following pusher member contacting the dog after the contact member has disengaged from the pusher member.

2. In a conveying system having a trolley movable from a main line into a secondary line by way of a transfer zone, said conveying system having pusher members and said trolley having a contact member for engagement by a pusher member for moving the trolley, the improvement comprising a locking element on the trolley, a normally upright dog behind the contact member, said dog being yieldable when struck by a moving pusher member, a cam at said transfer zone, said cam engaging the locking element in the transfer zone for movement of the locking element into operative position, said locking element in operative position engaging the dog and holding it in the upright position for engagement with the next following pusher member for positively pushing the trolley through the transfer zone after disengagement of the preceding pusher member from the contact member.

3. In a conveying system having a trolley movable through a transfer zone from a main line to a secondary line. said conveying system having a series of spaced pusher members and having a contact member on the trolley for engagement by a pusher member to advance the trolley, the improvement comprising a dog pivotally mounted on the trolley, said dog having a counterweight normally to hold the dog in an upright position, said dog being yieldable when unlocked to permit passage of the pusher, a locking element to lock the dog in the upright position, a cam at the transfer zone, said cam engaging said locking element and moving said locking element into locking engagement with said dog, said dog being engaged by the next following pusher member for positively pushing the trolley through the transfer zone after the contact member has disengaged from the preceding pusher member.

4. In a conveying system having a trolley movable from a main line track to a secondary line track at a transfer area, said conveying system having a series of spaced pusher members on the main line track and said trolley having a contact member for engagement by a pusher member for movement of the trolley, the improvement comprising a normally upright dog mounted on the trolley behind the contact member for engagement by a pusher member after disengagement of the preceding pusher member from the contact member, means to lock the dog in the upright position in the transfer zone for positive propulsion of the trolley through the transfer zone and onto the secondary line track, said means to lock the dog including a locking cam on the trolley movable into engagement with the dog to hold the dog in the upright position, said dog yieldable outside the transfer zone to permit a pusher to depress the dog and advance to the trolley contact member.

5. The apparatus of claim **4** wherein a lifting cam is provided on the main line track at the transfer zone to move the locking cam into operative position.

6. In a conveying system having a forward trolley and a rear trolley supporting a carrier, said forward and rear trolleys supported on a track and said carrier movable from a main line track to a secondary line track at a transfer zone, said conveying system having a series of spaced pusher members, said forward trolley having a contact member for engagement by a pusher member for normally moving the carrier, the improvement comprising a unitary dog pivoted in the rear trolley, said rear trolley having a stop member located rearwardly of the pivotal axis of said dog, said dog normally disposed in a lowered non-operative position to allow passage of the pusher members, a cam attached to the track preceding the transfer zone, said dog having a shank portion with a hub for pivoting said dog in the rear trolley, said dog having a tab extending from the top of the shank portion and overlying said cam, said tab on the dog engaging said cam in the transfer zone to raise the dog to its operative position, said dog further having a stepped section at the outer end of the shank portion, said stepped section resting on said stop member when said dog is in the non-operative position and when said dog is in the operative position, said stepped section is engageable with the next following pusher member for positively pushing the carrier through the transfer zone after the contact member on the forward trolley has disengaged from the preceding pusher member.

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