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Turner

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[54] **CONVEYOR SYSTEMS**

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[52] **U.S. Cl.** ..... **104/172 S,** 104/94, 104/172 C, 105/155

[51] **Int. Cl.** **B65g 17/42,** B61b 3/00

[58] **Field of Search** ..... 104/94, 95, 172 S, 172 C; 105/155, 154

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Attorney, Agent, or Firm—Waters, Roditi, Schwartz & Nissen

[57] **ABSTRACT**

A power-and-free conveyor system has a load trolley track formed of two parallel, spaced channel-form parts opening towards each other. Load trolleys running in the track each include two vertical side plates readily releasably interconnected by horizontal nut-and-bolt or pin-and-circlip connections. Each plate carries two rollers rolling in the track about horizontal axes and one roller rolling in the track about a vertical axis, the latter roller extending into a recess in the other plate. To remove each trolley from the track, the connections are released, dogs and certain other members removed, the plates are moved in opposite directions along the track so that the one roller of each plate leaves the associated recess, and each plate and its rollers are removed as a unit from the track in generally a width direction of the two channels.

2 Claims, 8 Drawing Figures

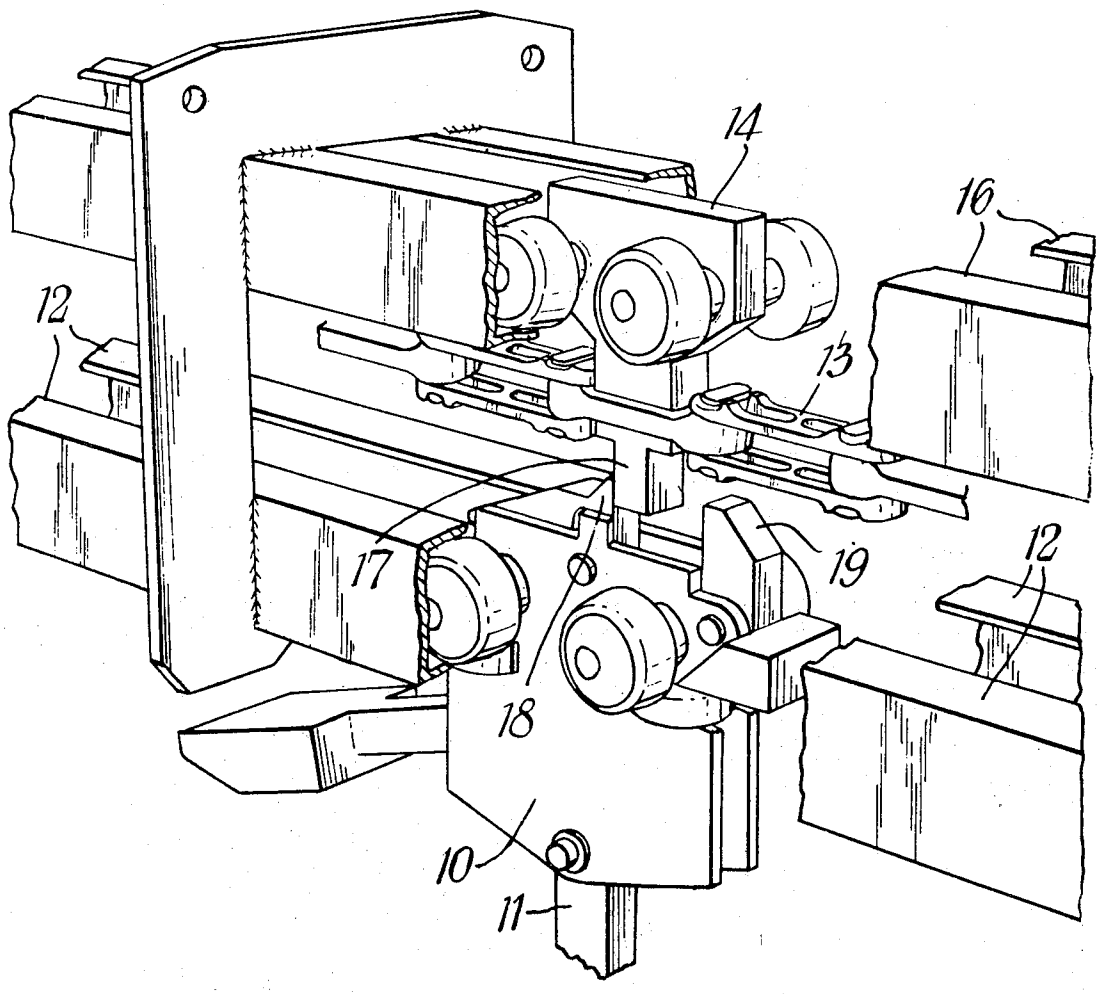


FIG.1

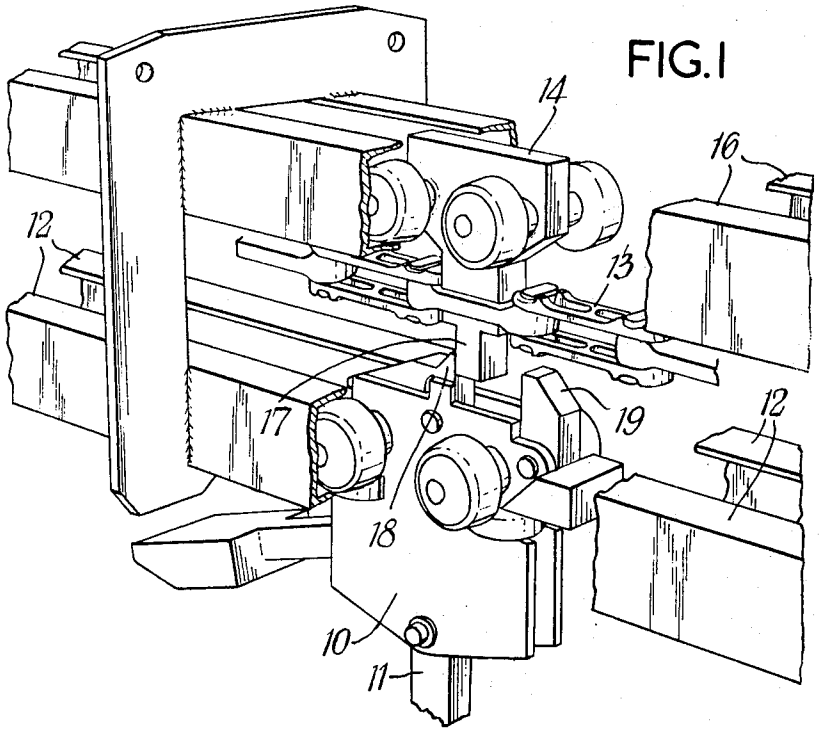
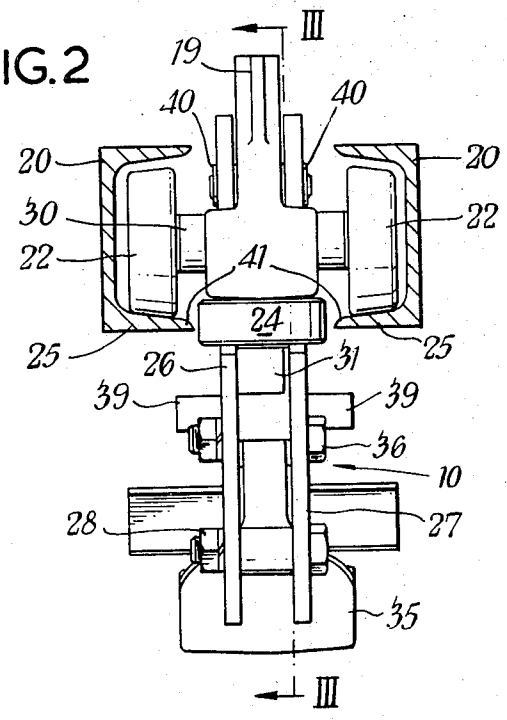


FIG. 2


III
19
40
40
20
20
30
22
22
41
24
25
26
31
25
39
39
36
10
28
27
35
III

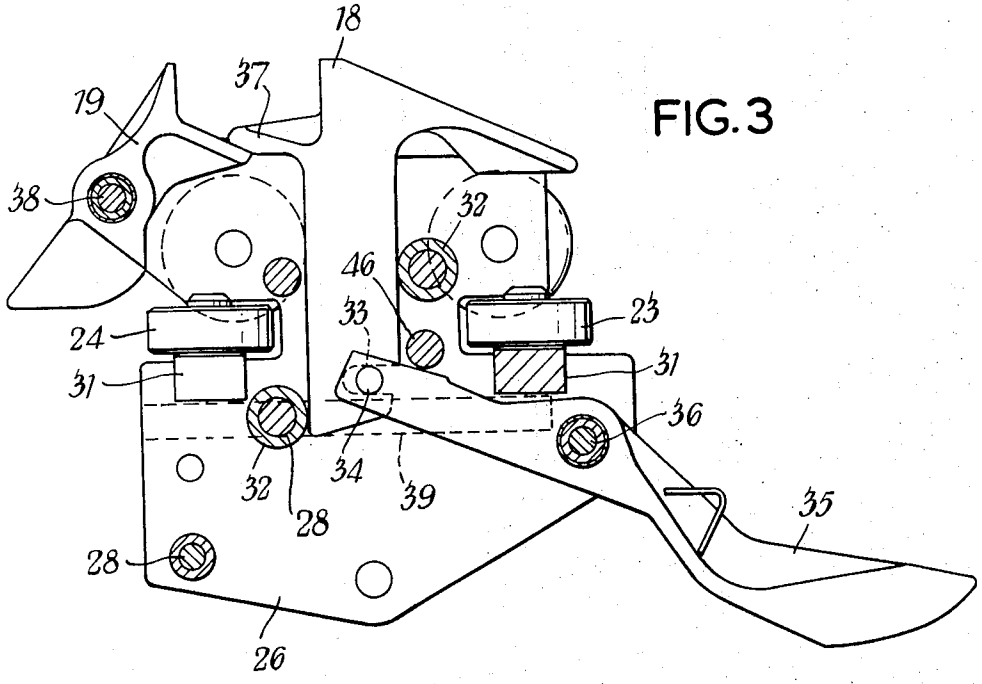

18
37
19
38
32
46
33
23
24
31
31
36
32
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28
26

FIG. 3

FIG.4

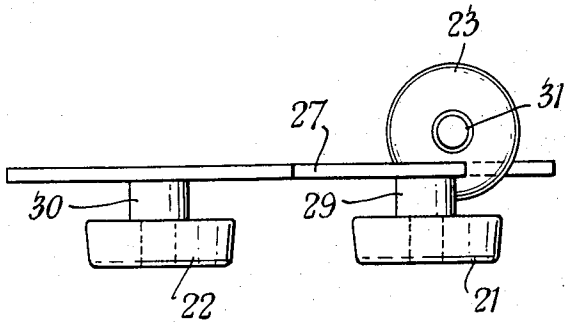
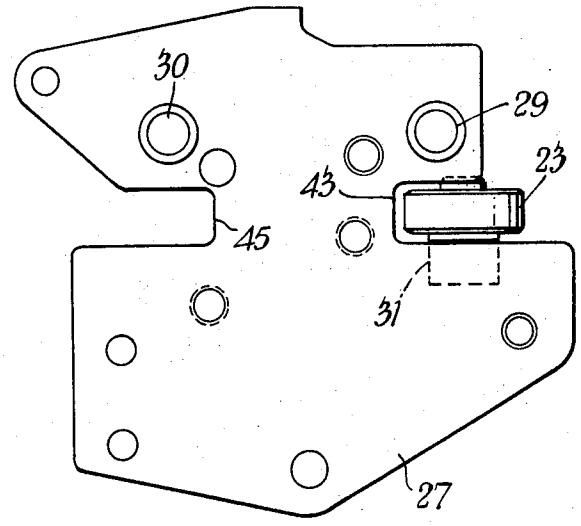


FIG.5



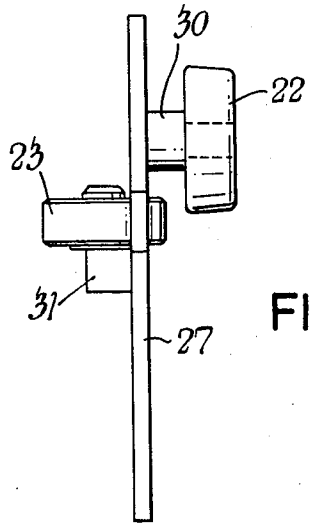


FIG.6

FIG. 7

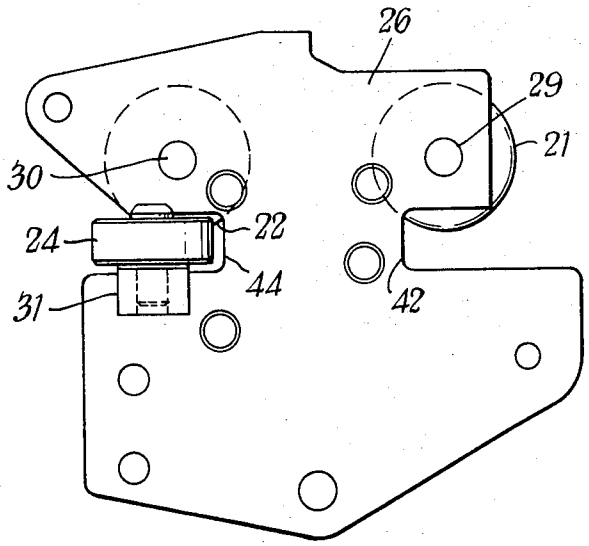
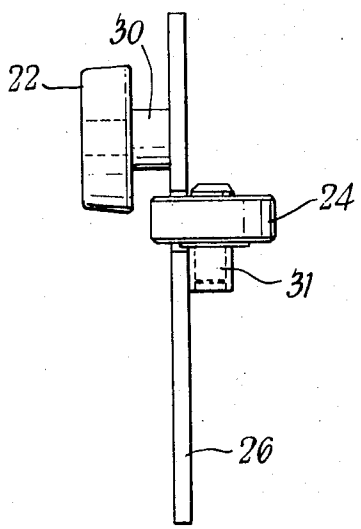


FIG. 8



CONVEYOR SYSTEMS

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a trolley of a conveyor system, particularly a power-and-free conveyor system, and to methods of removing the trolley from a track of the system and of mounting the trolley in the track.

2. Description of the Prior Art

In a known power-and-free conveyor system, load trolleys are driven along a load trolley track by pushers depending from a power chain attached to chain trolleys running in a chain track extending parallel to and above the load trolley track. Each track consists of two channel-form parts which extend parallel to each other along the track and the mouths of which open towards each other and are spaced from each other. Each load trolley includes two vertical side plates which are spaced from and parallel to each other. Arranged between the plates of each load trolley are driving and holdback dogs of each trolley, while arranged laterally outside the plates are front and rear pairs of guide wheels whereby the trolley is guided in the load trolley track and which rotate about horizontal axes. Each driving dog is linearly displaceable perpendicularly to the tracks by means of a proximity lever projecting forwards from the trolley, while each holdback dog is pivotable relative to the plates. The linear displacement of each driving dog is guided by guide rollers between the side plates. The latter are fixed to each other by riveting at the pivot axes of the holdback dog and the proximity lever and at the rolling axes of the guide rollers. Each trolley is also guided in the track by front and rear single guide wheels which rotate about axes perpendicular to the tracks and which run in the gap between the respective lower flanges of the channel-form parts of the load trolley track. The two single guide wheels of each trolley are both mounted on one of the two side plates of the trolley and extend into recesses formed in the other of the side plates, these recesses extending parallelly to the load trolley track from the respective front and rear edges of that other side plate.

This known arrangement is found to be particularly disadvantageous when the load trolley is damaged or breaks down and thus needs to be taken out of service. It is often necessary to move the trolley some considerable distance along its track to a maintenance section of the track. Depending on the damage to or failure in the trolley, it may have to be moved through this distance by hand. Thus the time that the conveyor is out of operation may be quite considerable, taking into account for example the need to move all of the preceding or following trolleys out of the way. So a whole production line may be put out of operation for a considerable time with an appreciable resulting loss of production, simply because of damage to or failure of a single trolley. Even when the trolley has been forwarded to the maintenance section, the rivets have to be drilled out before the trolley can be dismantled to be repaired. They cannot all be drilled out at the damage or breakdown region and then the trolley be dismantled at that region, because the channel-form parts of the load trolley track prevent access to the rivets by a drill. Moreover, even if it were possible to drill out all of the rivets at the damage or breakdown region, the trolley still

could not be dismantled at that region because the aforementioned other side plate is restrained in its movement relative to the aforementioned one side plate by the two single guide wheels which extend in the recesses in that other side plate.

SUMMARY OF THE INVENTION

According to one aspect of the present invention, there is provided in a conveyor system, a combination comprising a track comprised of first and second channel-form parts which extend parallel to each other along the track and the mouths of which open towards each other and are spaced from each other, and a trolley carried by said track and comprising first and second frame members, first and second guide wheels disposed in the track to roll in the respective channel-form parts and mounted on the respective frame members, and connecting means readily releasably interconnecting said first and second frame members, each of the frame members and its associated wheel, following release of said connecting means, being removable from said track, with the wheel still mounted on the frame member, in generally a direction of the width dimension of said mouths.

According to another aspect of the present invention, there is provided a method of removing a trolley from a track in a conveyor system, which track is comprised of first and second channel-form parts which extend parallel to each other along the track and the mouths of which open towards each other and are spaced from each other, comprising releasing readily releasable connecting means which interconnect first and second frame members of said trolley on which are mounted respective first and second guide wheels disposed in the track to roll in the respective channel-form parts, and subsequently removing each of the frame members and its associated wheel from said track, with the wheel still mounted on the frame member, in generally a direction of the width dimension of said mouths.

According to a further aspect of the present invention, there is provided a method of mounting a trolley in a track in a conveyor system, which track is comprised of first and second channel-form parts which extend parallel to ach other along the track and the mouths of which open towards each other and are spaced from each other, comprising inserting a first trolley frame member mounting a first guide wheel to between said channel-form parts in generally a direction of the width dimension of said mouths, inserting a second trolley frame member mounting a second guide wheel to between said channel-form parts in generally a direction of said width dimension, and then interconnecting the first frame member and the second frame member with readily releasable connecting means so that the first and second guide wheels are disposed to roll in the respective channel-form parts.

By means of the invention, it is possible for a damaged or failed load trolley to be dismantled and removed from the track at or near the damage or breakdown location on the load trolley track, and also, if desired, for the repaired trolley or a replacement trolley to be assembled in the track at or near the damage or breakdown location. Thus loss of production can be appreciably reduced.

BRIEF DESCRIPTION OF THE DRAWINGS

In order that the invention may be clearly understood

and readily carried into effect, reference will now be made, by way of example, to the accompanying drawings, in which:

FIG. 1 is a diagrammatic, fragmentary, perspective view of part of a conveyor system,

FIG. 2 shows a rear elevation of a load-carrying trolley of the system, a track being shown in cross-section,

FIG. 3 shows a section through the trolley taken substantially on the line III—III of FIG. 2,

FIG. 4 shows a plan view of a sub-assembly of the trolley,

FIG. 5 shows a side elevation of the sub-assembly, but with two wheels removed for the sake of clarity,

FIG. 6 shows a rear end view of that sub-assembly,

FIG. 7 shows a side elevation of another sub-assembly of the trolley, and

FIG. 8 shows a rear end view of that other sub-assembly.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings, the conveyor system is of the power-and-free kind, in which identical load-carrying trolleys (of which one is shown and referenced **10**) supporting load-suspension bars (of which one is shown and referenced **11**) are propelled along a load carrying trolley track **12** by a chain **13** mounted by identical chain trolleys (of which one is shown and referenced **14**) in a chain trolley track **16.** The trolley **14** carries a pusher dog **17** which co-operates with a reciprocable driving dog **18** and a pivotal hold-back dog **19** carried at the top of the trolley **10** to advance the trolley **10** along the track **12** and to hold back the trolley **10,** respectively.

Each track **12** or **16** is comprised of two channel-form parts which extend parallel to each other along the track and the mouths of which open towards each other and are spaced from each other. The two channel-form parts of the track **12** are referenced **20** in FIG. **2.** The trolley **10** includes a pair of front wheels **21** and a pair of rear wheels **22,** each pair of wheels rotating about a common horizontal axis. The wheels **21** roll in the respective parts **20** and bear on the lower flanges **25** of the respective parts **20,** the wheels **22** doing likewise. The trolley **10** also has a forward single wheel **23** and a rearward single wheel **24,** each of which rolls in the gap between inner edges **41** of the flanges **25** and rotates about an axis perpendicular to the plane of the horizontal axes of the wheels **21** and **22.** The trolley has a form of frame which consists of two vertical, lateral, co-extensive plates **26** and **27** interconnected at a spacing from each other by two horizontal nut, bolt and collar devices **28** and **36.** The plate **26** has fixed thereto bearings **29, 30,** and **31** whereby are mounted on the plate **26,** the wheels **21** and **22** at the same side of the trolley as the plate **26,** as well as the wheel **24.** Similarly, the plate **27** has fixed thereto bearings **29** to **31** for the wheels **21** and **22** at the other side of the trolley, as well as the wheel **23.** The forward wheel **23** extends through recesses **42** and **43** formed in the plates **26** and **27,** respectively, and extending rearwardly from the forward edges of those plates, while the rearward wheel **24** extends through recesses **44** and **45** formed in the plates **26** and **27,** respectively and extending forwardly from the rearward edges of those plates. Thus, each plate extends through the space between the wheels **23** and **24.**

The driving dog **18** is mounted between the plates **26** and **27** and is guided by rollers **32** so as to be reciprocable perpendicularly to the plane containing the axes of the wheels **21** and **22,** the lower end of the dog **18** being formed with a horizontal recess **33** along which slides a pin **34** fixed in one end of a two-arm proximity lever **35** pivotally mounted on the device **36.** Clockwise movement of the lever **35** is limited by a horizontal pin **46.** The dog **18** is roughly or T-shape with its cross limb extending lengthwise of the track **12.** The rear end **37** of its cross limb co-operates with a forward portion of the dog **19** such that, when the dog **18** is lowered, the dog **19** is lowered simultaneously. The dog **19** is turnable about a horizontal pivot **38.** Mounted on the respective plates **26** and **27** are limit-switch strikers **39** which serve to operate limit switches (not shown). All of the transverse pins or bolts which extend through the plates **26** and **27** are retained therein by some readily releasable means such a circlips or nuts. For example, the pivot **38** is retained by circlips **40.** To remove the trolley **10** from the track **12,** for example in the case of breakdown of the trolley, initially the device **36** is released and removed and the lever **35** removed forwardly. With the dog **18** no longer retained by the pin **34,** the dog **18** can now be removed vertically upwardly. Next the circlips **40** are detached and the pivot **38** withdrawn, so that the dog **19** can be removed. Then the remaining readily releasable means are released and removed. There now remains in the track the two sub-assemblies of FIGS. **4** and **7.** One of these is displaced along the track **12** relatively to the other in a direction such that the wheel **23** or **24** moves out of the open end of the recess **42** or **45** and until the one sub-assembly is free of the other and its lower end is then turned outwardly so that the plate of the sub-assembly becomes oblique to the vertical. This turning swings the wheel **23** or **24** downwardly out of the gap between the flanges **25.** Thereupon, by further manipulation the plate **26** or **27** and the wheels **21** and **22** mounted thereon can be removed downwardly through that gap. The other sub-assembly is then removed in a similar manner. It will be appreciated that such removal of each of the sub-assemblies takes place in generally a direction of the width dimension of the mouths of the parts **20.**

It will be readily appreciated that mounting of the trolley in the track **12** can be performed in a reverse manner to the removal thereof from the track, so that the operation of mounting the trolley in the track need not be described in detail.

The present invention is applicable to various kinds of trolleys, for example to leading rolleys, intermediate trolleys, or trailing trolleys, of load carriers of a power-and-free conveyor system, or to load carriers formed by respective single trolleys.

A principle advantage of the trolley described with reference to the drawings is that the user can rapidly replace the trolley in the event of a breakdown, thus minimizing the lost production time, particularly since there is no need to divert the affected trolley to the maintenance section of the conveyor system, which could be at a considerable distance away from the breakdown.

I claim:

1. In a conveyor system a combination comprising a track having first and second channel-form parts extending parallel to each other along the track, said parts having mouths which open towards each other and are spaced from each other, and a trolley carried by said track and comprising first and second frame members, first and second guide wheels disposed in the track to roll in the respective channel-form parts and mounted on the respective frame members, and connecting means releasably interconnecting said first and second frame members, each of the frame members with associated wheel following release of said connecting means, being removable from said track, with the wheel remaining mounted on the frame member, in substantially a direction of the width dimension of said mouths, said trolley further comprising a lever pivotally mounted between said frame members on a releasable connection of said connecting means, a driving dog slidingly guided between said frame members by said frame members and other releasable connections of said connecting means, and a releasable coupling between said lever and said driving dog whereby said lever can displace said dog.

2. A combination according to claim 1, wherein said releasable coupling comprises a pin-and-slot coupling, having a pin which can be withdrawn from the slot in substantially longitudinal direction of said track.

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