United States Patent

[11] 3,547,043

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[21] Appl. No. **693,641**
[22] Filed **Dec. 26, 1967**
[45] Patented **Dec. 15, 1970**
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[54] **TOW TRUCK CONVEYOR SYSTEM**
18 Claims, 5 Drawing Figs.

[52] **U.S. Cl.** **104/172,** 104/178
[51] **Int. Cl.** **B61b 13/00**
[50] **Field of Search** 104/172, 173, 178

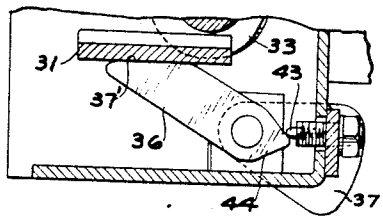
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ABSTRACT: The tow truck conveyor system disclosed herein comprises a track defined by a slot in the floor with a conveyor movable along the slot. A tow truck has a tow pin which extends downwardly through the slot and is movable into and out of engagement with the conveyor. In order to prevent inadvertent movement of the tow pin out of engagement with the conveyor when the tow truck is moving upwardly or downwardly on an inclined portion of the track, locking means are provided on the tow truck which are actuated by cams along the track to prevent such inadvertent movement of the tow pin upwardly.



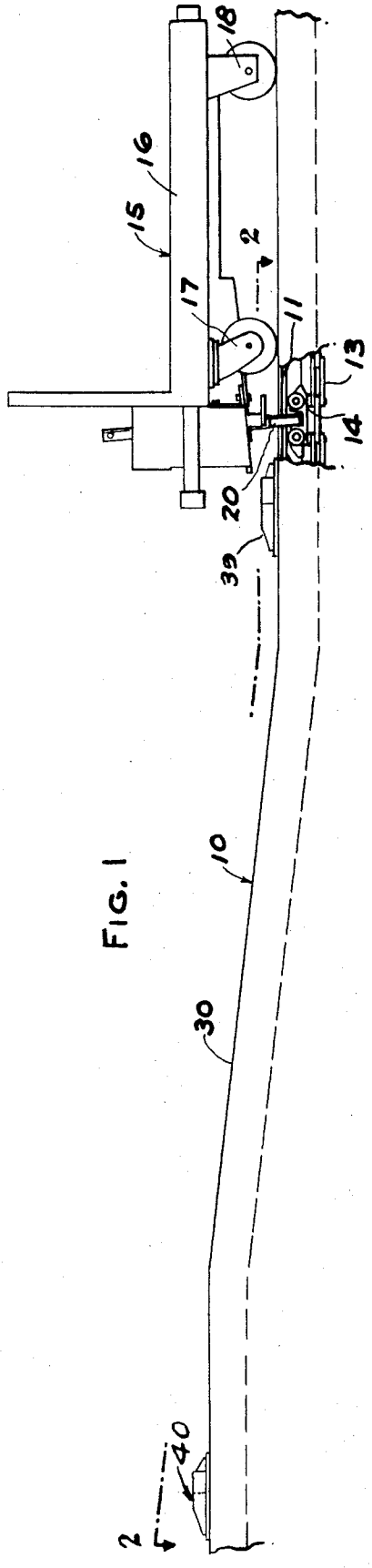


FIG. 1

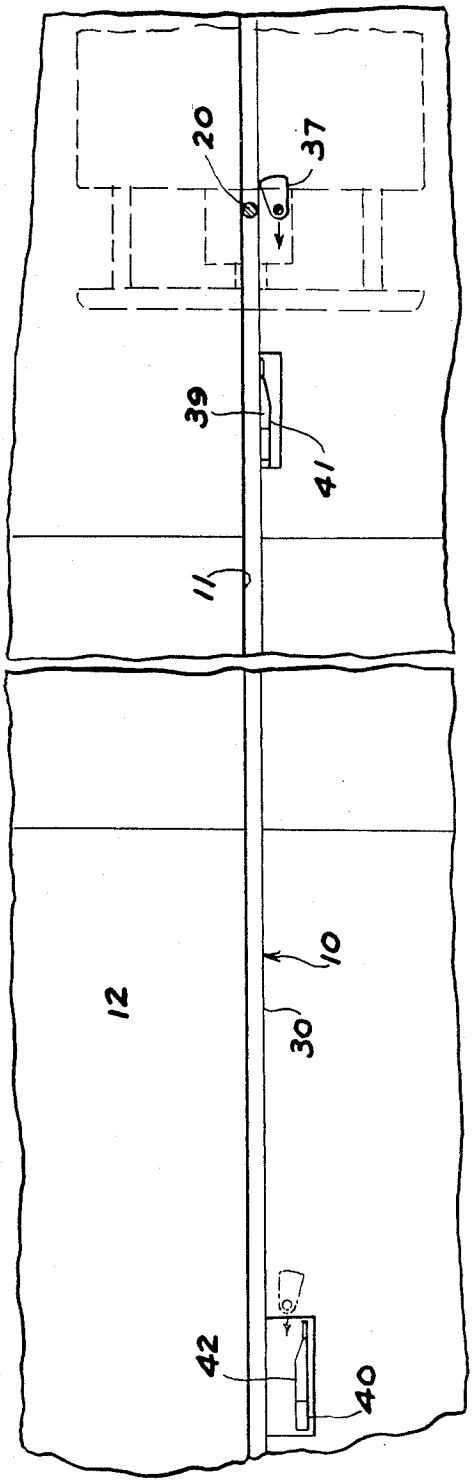


FIG. 2

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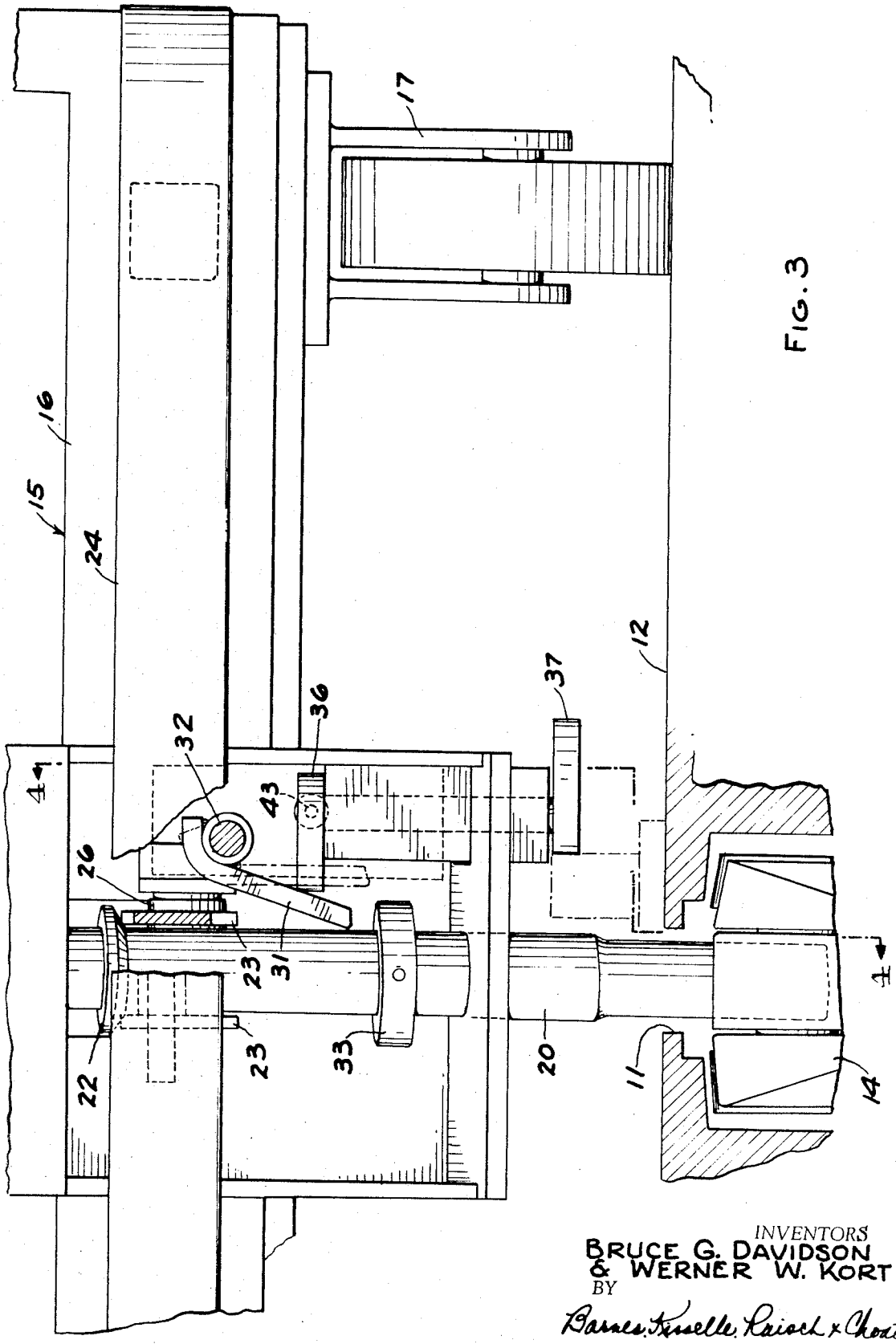


FIG. 3

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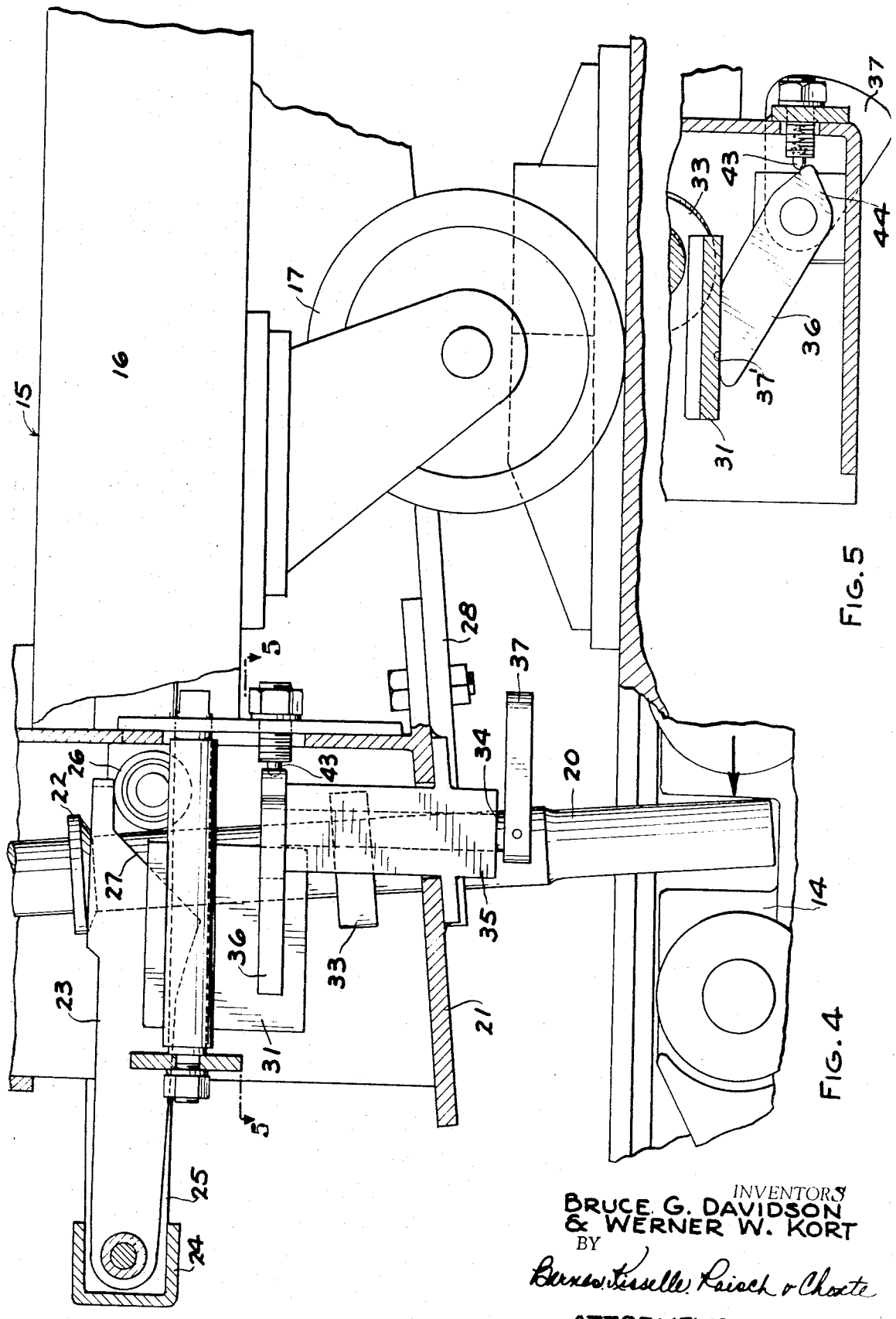


FIG. 5

FIG. 4

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TOW TRUCK CONVEYOR SYSTEM

This invention relates to conveyor systems and particularly to such conveyor systems which have tow trucks with movable tow pins.

In conveyor systems, it is common to have carriers with interengaging members that are movable toward and away from a conveyor to cause engagement with the conveyor so that the conveyor will move the carriers along the track. In one commonly used type of system, tow trucks, each with a tow pin, are provided with the tow pins extending downwardly through a track defined by a slot in the floor into engagement with a conveyor beneath the floor. In such systems, there is a tendency on inclined portions of the track for the tow pin to move upwardly out of engagement with the conveyor as the tow truck is moved up or down the inclined portion.

Among the objects of the invention are to provide a system wherein such inadvertent movement of the interconnecting member or tow pin is prevented; which is relatively simple and positive; which is low in cost; which can be adapted to present carriers; and which utilizes a minimum number of parts.

In the drawings:

FIG. 1 is a partly diagrammatic part sectional side elevational view of a system embodying the invention.

FIG. 2 is a fragmentary plan view of the same taken along the line 2–2 in FIG. 1.

FIG. 3 is a fragmentary part sectional front elevational view on an enlarged scale of a portion of the system shown in FIGS. 1 and 2.

FIG. 4 is a fragmentary sectional view taken along the line 4–4 in FIG. 3.

FIG. 5 is a fragmentary sectional view taken along the line 5–5 in FIG. 4.

Referring to FIG. 1, the conveyor system embodying the invention comprises a track **10** defined by a slot **11** in the floor **12**. A chain conveyor **13** is driven beneath the slot **11** and includes wheeled trolleys **14**. A tow truck **15** comprising a body **16**, wheeled casters **17** at the front end and fixed axle wheels **18** at the rear end is movable along the track by engagement of a tow pin **20** thereon with a trolley **14** of the conveyor.

As shown in FIGS. **3** and **4**, the tow pin **20** is movable generally vertically within a frame **21** on the front of the tow truck **15**. The tow pin includes a collar **22** that rests upon a pair of arms **23** pivoted at their forward ends to a bumper **24** that is mounted for horizontal movement on the front end of the tow truck by shafts **25**. The rear ends of the arms **23** rest upon rollers **26** and are formed with cam surfaces **27** so that when the bumper **24** engages an obstacle or the preceding carrier, the arms **23** are cammed upwardly to lift the tow pin **20** out of engagement with the trolley **14**. The tow pin **20** is mounted for limited fore and aft movement in accordance with well known construction and has shock absorbing means operatively connected thereto by a movable plate **28**.

As shown in FIG. **1**, the floor including the track has an inclined portion **30**. In order to eliminate any tendency of the tow pin **20** to move upwardly out of engagement with the trolley **14** as the tow truck **15** is moved up the inclined portion of the track, locking means is provided on the tow truck. As shown in FIG. **3**, this comprises a lever **31** that is pivoted on a shaft **32**. Normally, the lever **31** hangs downwardly in the broken line position shown in FIG. **3** under the influence of its own weight. However, the lever is movable, as presently described, so that its lower end is in overlying relationship with a collar **33** on the tow pin. In this position, inadvertent upward movement of the tow pin is prevented by engagement of the collar **33** with the lower end of the lever **31**.

The lever **31** is actuated as the tow truck approaches the inclined portion **30** into overlying position with the collar **33** and is again actuated when the tow truck reaches the upper end of the inclined portion of the track so that it returns to its original position.

The actuating means for the lever **31** comprises a shaft **34** that is rotatably mounted in a bracket **35** on the front end of the tow truck and has an upper cam **36** and a lower cam **37** fixed thereon. As shown in FIG. **5**, the upper cam **36** comprises an elongated bar that has a surface **37'** for engaging the lever **31** and moving the lever into overlying relation with the collar **33**. The lower cam **37** has a general teardrop shape as shown in FIG. **2** and is adapted to be actuated by an actuating cam **39** adjacent the lower end of the inclined portion of the track and deactuating cam **40** adjacent the upper end of the inclined portion of the track. Specifically, cam **39** includes an upwardly extending surface **41** that tends to rotate the cam **37** clockwise as viewed in FIG. **2** to swing the cam **36** counterclockwise as viewed in FIG. **5** and, in turn, swing the lever **31** into overlying relationship with the collar **33**. The cam **40** similarly includes a surface **42** that tends to swing the cam **37** in the opposite direction or counterclockwise as viewed in FIG. **2** to swing the cam **36** out of the way permitting gravity to return the lever **31** to its original position out of overlying relationship with the collar **33**.

As shown in FIG. **5**, an adjustable spring-loaded detent member **43** is provided on the front end of the carrier and cooperates with a triangular projection **44** on the cam **36** to tend to hold the cam **36** in either of its two positions, namely, in engagement with the lever **31** or out of engagement with the lever **31**.

We claim:

1. In conveyor system, the combination comprising:
a track;
a conveyor movable along said track;
a carrier;
said carrier having an interengaging member movable toward and away from the conveyor for operatively connecting the carrier to the conveyor;
means on the carrier for locking said member against movement away from said conveyor;
said carrier comprising a tow truck;
said interengaging member comprising a tow pin mounted on said tow truck;
said locking means comprising a member pivotally mounted about a generally horizontal axis on said carrier;
said tow pin having a collar thereon;
and cam means operable on said locking member to hold said locking member into overlying relation to said collar to prevent movement of said tow pin outwardly from said conveyor;
said cam means comprising a member mounted for pivotal movement about a generally vertical axis and having a first cam portion adjacent its upper end for actuating said locking member;
said last-mentioned member including a second cam portion adjacent the lower end thereof; and
said track having a cam at one portion thereof for engaging said second cam portion to move said locking member into overlying relationship with the collar on said tow pin and a second cam further along said track for engaging said second cam portion to permit said locking member to return to its original position out of overlying relationship with said collar.

2. In conveyor system, the combination comprising:
a track;
a conveyor movable along said track;
a carrier;
said carrier having an interengaging member movable toward and away from the conveyor for operatively connecting the carrier to the conveyor;
means on the carrier operable upon engagement of the carrier with an obstacle or another carrier to move said interengaging member away from the conveyor; and
means on the carrier operable independently of said last-mentioned means for positively locking and holding said member against movement away from said conveyor.

3. The combination set forth in claim **2** wherein said locking means comprises a locking member movable into movement obstructing relation with said interengaging member.

4. The combination set forth in claim **2** including means along said track for actuating said locking means and means at

a point further along said track for deactivating said locking means.

5. The combination set forth in claim 4 wherein said means for actuating said locking means is positioned adjacent the lower end of an inclined portion of said track and means for unlocking said locking means is positioned adjacent the upper end of said inclined portion of the track.

6. The combination set forth in claim 4 wherein said means along said track comprises a cam adapted to engage and operate said locking means.

7. The combination set forth in claim 6 wherein said means further along said track includes a second cam for engaging and operating said member.

8. The combination set forth in claim 2 wherein said carrier comprises a tow truck, said interengaging member comprising a tow pin mounted on said tow truck.

9. The combination set forth in claim 8 wherein said locking means comprises a member pivotally mounted about a generally horizontal axis on said carrier;

said tow pin having a collar thereon; and

cam means operable on said locking member to hold said locking member into overlying relation to said collar to prevent movement of said tow pin outwardly from said conveyor.

10. The combination set forth in claim 9 wherein said cam means comprises a member mounted for pivotal movement about a generally vertical axis and having a first cam portion adjacent its upper end for actuating said locking member.

11. In conveyor system, the combination comprising:

a track;

a conveyor movable along said track;

a carrier;

said carrier having an interengaging member movable toward and away from the conveyor for operatively connecting the carrier to the conveyor;

means on the carrier operable upon engagement of the carrier with an obstacle or another carrier to move said interengaging member away from the conveyor; and

means on the carrier operable independently of said last-mentioned means and responsive to movement of the carrier along the track for positively locking and holding said member against movement away from said conveyor.

12. The combination set forth in claim 11 wherein said locking means comprises a member movable into movement of structive relation with said interconnecting member.

13. The combination set forth in claim 11 wherein said carrier comprises a tow truck, said interengaging member comprising a tow pin mounted on said tow truck.

14. The combination set forth in claim 13 wherein said locking means comprises a member pivotally mounted about a generally horizontal axis on said carrier;

said tow pin having a collar thereon; and

cam means operable on said locking member to hold said locking member into overlying relation to said collar to prevent movement of said tow pin outwardly from said conveyor.

15. The combination set forth in claim 14 wherein said cam means comprises a member mounted for pivotal movement about a generally vertical axis and having a first cam portion adjacent its upper end for actuating said locking member.

16. In conveyor system, the combination comprising:

a track;

a conveyor movable along said track;

a carrier;

said carrier having an interengaging member movable toward and away from the conveyor for operatively connecting the carrier to the conveyor;

means on the carrier responsive to movement of the carrier along the track for locking said member against movement away from said conveyor;

said carrier comprising a tow truck;

said interengaging member comprising a tow pin mounted on said tow truck;

said locking means comprising a member pivotally mounted about a generally horizontal axis on said carrier;

said tow pin having a collar thereon;

and cam means operable on said locking member to hold said locking member into overlying relation to said collar to prevent movement of said tow pin outwardly from said conveyor;

said cam means comprising a member mounted for pivotal movement about a generally vertical axis and having a first cam portion adjacent its upper end for actuating said locking member;

said last-mentioned member including a second cam portion adjacent the lower end thereof; and

said second cam portion being adapted to be engaged by a first cam along the track to move said locking member into overlying relationship with the collar on said tow pin and by a second cam further along said track for engaging said second cam portion to permit said locking member to return to its original position out of overlying relationship with said collar.

17. The combination set forth in claim 16 including detent means for holding said last-mentioned member in each of said positions.

18. The combination set forth in claim 16 wherein said detent means is operable on said first cam portion.