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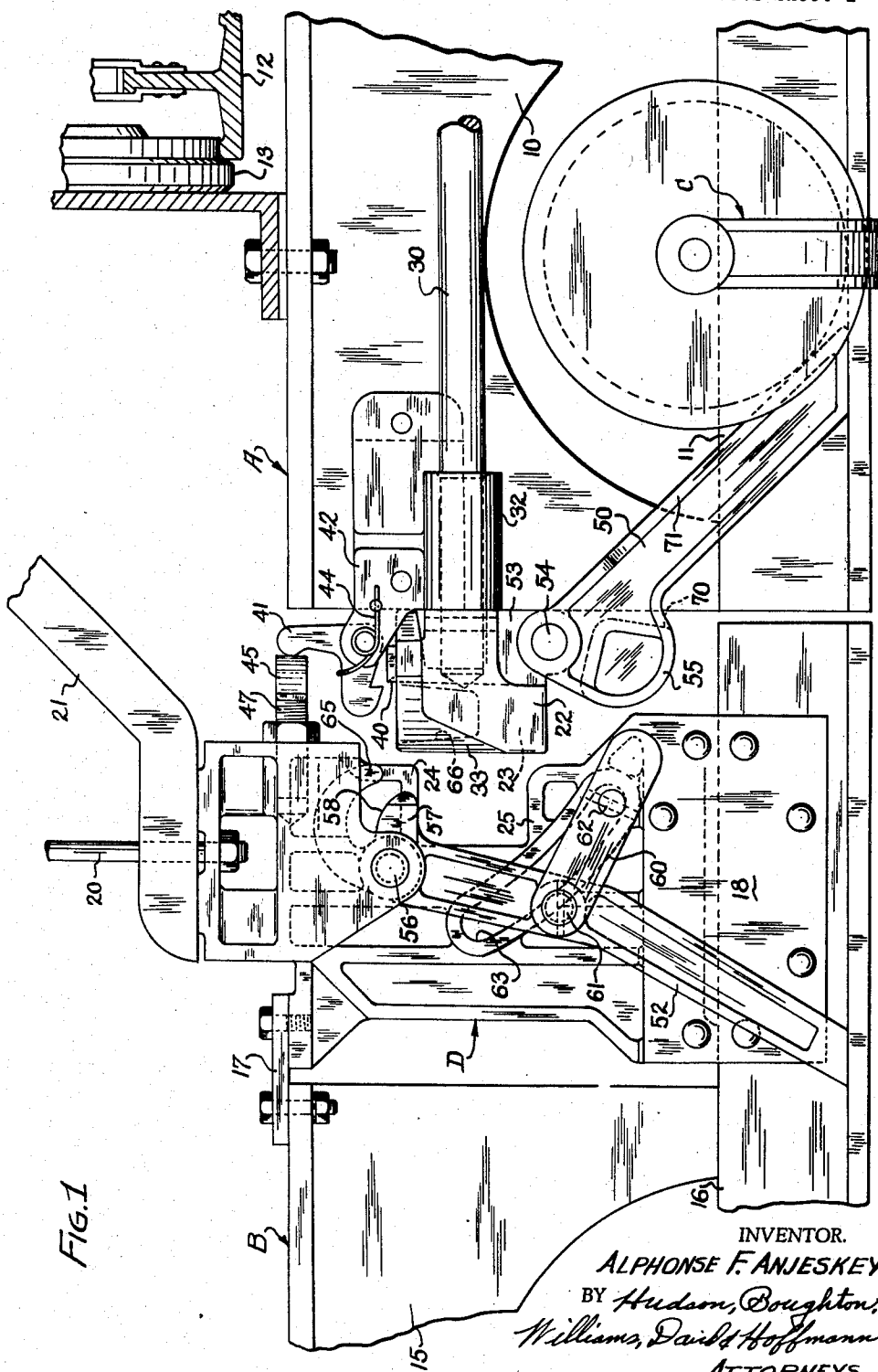
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2,947,261

OVERHEAD MONORAIL SYSTEM

Filed Aug. 22, 1958

3 Sheets-Sheet 1



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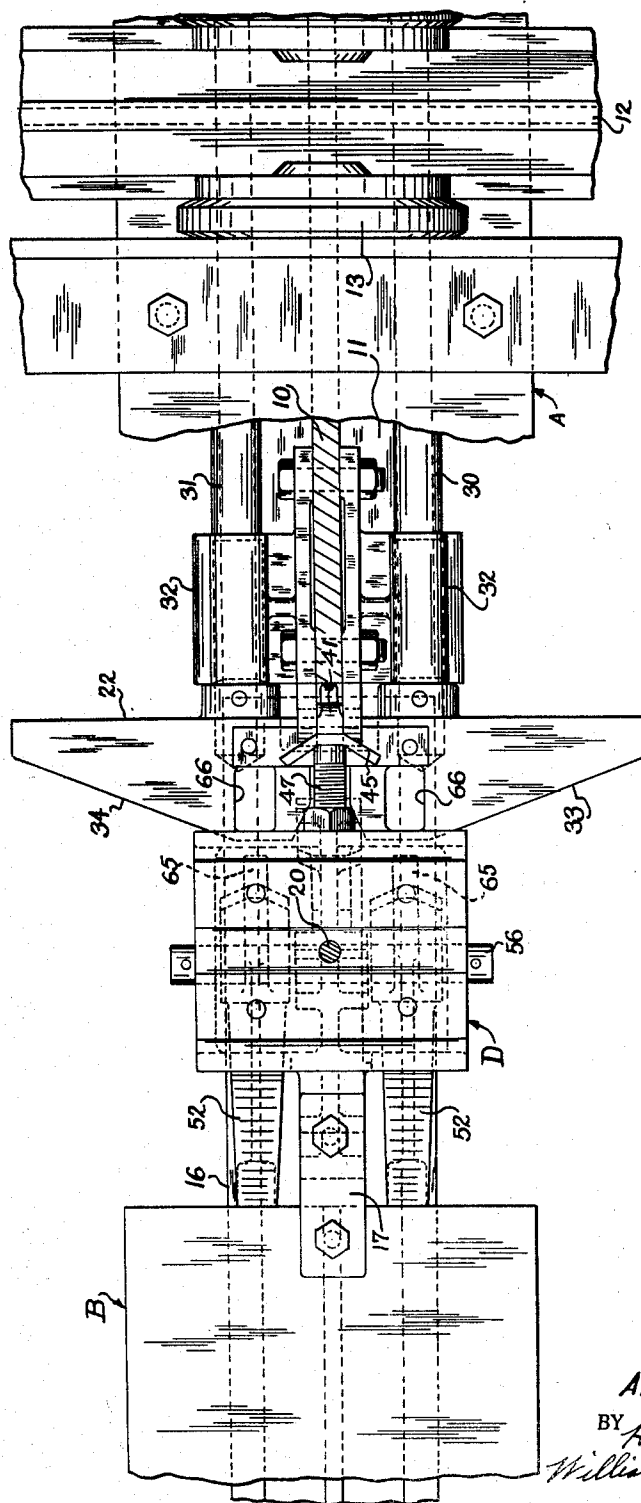


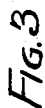
FIG. 2

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OVERHEAD MONORAIL SYSTEM

3 Sheets-Sheet 3



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OVERHEAD MONORAIL SYSTEM

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2 Claims. (Cl. 104—98)

The present invention relates to material handling, overhead, monorail carrier systems comprising an overhead transfer bridge having a carrier rail adapted to be selectively aligned with a carrier rail of one or more stationary tracks or transfer bridges and, more particularly, to mechanism for locking a transfer bridge to a stationary track or to another transfer bridge with the respective carrier rails in end-to-end alignment.

The principal object of the present invention is the provision of a new and improved, overhead, monorail carrier system having a transfer bridge selectively alignable with one or more stationary tracks or transfer bridges and comprising safety stops at the open ends of the rails engageable with the wheels of the carriers for limiting the movement of carriers toward the open ends of the respective rails, unless locked in proper alignment with another rail for transfer of a carrier from one rail to the other; in combination with means for preventing unlocking of the rails and, in turn, disalignment thereof after a carrier wheel has reached a position underneath one of the stops until it has been retracted from that position or has passed by the stop on the adjacent end of the adjoining rail, whereby all possibilities of a carrier wheel dropping off the end of a rail are eliminated.

The invention resides in certain details of construction and combinations and arrangements of parts and further objects and advantages thereof will be apparent to those skilled in the art to which the invention relates from the following description of the preferred embodiment described with reference to the accompanying drawings forming a part of this specification, in which similar reference characters designate corresponding parts, and in which:

Fig. 1 is a fragmentary, side elevational view of a material handling overhead monorail carrier system embodying the invention;

Fig. 2 is a top plan view of the portion of the overhead carrier system shown in Fig. 1, part of which is broken away; and

Fig. 3 is a view similar to Fig. 1 but showing the parts in a different operative position.

Referring to the drawings, Fig. 1 is a fragmentary view of an overhead, monorail carrier system showing one end of an overhead transfer bridge and an end portion of a stationary track structure B. The transfer bridge A and structure B are shown in side elevation and positioned so that material handling carriers, designated generally as C and only a portion of one of which is shown, can be transferred from one to the other. The particular system illustrated is a hand-propelled or hand-powered system. The invention, however, is equally applicable to an electrified system in which the carriers or transfer bridges, or both, are electrically powered.

The transfer bridge A comprises a track assembly, including a girder 10 of T-section, to the lower part of which is welded a carrier rail 11 of inverted T-section, which rail forms the lower or tension member of the girder. The opposite ends of the girder are suspended

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from inverted T-section rails 12 by means including wheels 13. The rails 12 are suspended from an overhead structure in a suitable manner and which form a runway for the transfer bridge A. The particular means by which the runway for the bridge is supported forms no part of the present invention and suffice it to say it is preferably flexibly suspended by hanger rods, not shown, to assist in relieving stresses, wheel flange friction, etc.

As is well understood in the art, the transfer bridge A is adapted to move along its runway into selective alignment with stationary tracks or other bridges and receive and transfer overhead carriers from one location to another. In the embodiment shown, the track structure B is stationary and comprises a T-girder 15 having an inverted T-carrier rail 16 welded to the bottom thereof, which rail forms the lower or tension member of the girder. As seen in Fig. 1, the girder 15 terminates short of the end of rail 16 and a casting D is fixed in the opening thus formed by a member 17 fixed to the top thereof and to the top of the girder and by side plates 18 only one of which is shown, riveted to the lower end thereof and to the web of the rail 16. The girder 15 is suitably supported by means, including the hanger 20 and the bracket 21 connected to the top of the casting D so that the outer end of the rail 16 has the same elevation as the adjacent end of the bridge rail 11.

The bridge A is adapted to be locked against movement on its runway with the rails 11, 16 in end-to-end alignment by a bolt-like member 22 provided with a flared notch 23 adapted to receive an edge portion or portions 24, 25 of plate D, as seen in Figs. 1 and 3, to interlock the member with the plate. The bolt-like member 22, as shown, is attached to the ends of two rods 30, 31 located on opposite sides of girder 10 and slidingly supported by a pair of spaced guide bushings 32 at opposite sides of the girder 10, only one of which bushings at each side is shown. The rods 30, 31 and, in turn, the bolt-like member 22, are adapted to be reciprocated between retracted or unlocking and locking positions shown in Figs. 1 and 3, respectively, in any convenient and suitable manner.

Preferably, the bolt-like member 22 is spring-biased into its locking position and its outer forward face is provided with cam surfaces 33, 34 which slope rearwardly towards opposite sides and cooperate with the casting D to cam the bolt-like member rearwardly or toward its retracted position as the operator aligns the rails 11, 16.

The apparatus thus far described is generally similar to that shown and described in my Patent No. 2,642,814, issued June 23, 1953, as is the apparatus for reciprocating the rods 30, 31 and the bolt-like member 22 carried thereby, which apparatus is not herein shown and described. As is the case in my prior patent, the preferred embodiment herein shown comprises mechanisms whereby the bolt-like member 22 may be pre-set in its retracted or inoperative position and actuated to automatically interlock the transfer bridge with a stationary track section as the transfer bridge aligns therewith. This mechanism is similar to that shown in my prior patent and will not be described in detail. Suffice it to say that the bolt-like member 22 is provided with a catch 40 at its top adapted to be engaged by a hook formation on a pawl or latch 41 pivoted to the girder 10 of the transfer bridge A above the catch member. As shown, the latch 41 is pivoted between projecting flanges of a bracket 42 secured to the end of the girder 10 and is normally urged by a spring 44 in a counterclockwise direction as viewed in Figs. 1 and 3, that is, in a direction to engage the end of the latch member with the catch 40.

The latch 41 is adapted to be automatically tripped or

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rotated in a clockwise direction to release the bolt-like member 22 as the rail of the transfer bridge is moved into end-to-end alignment with the stationary rail by a cam member 45, adjustably connected to the upper end of the casting D, which cam is adapted to be engaged by the projecting end of the vertically extending arm of the latch 41 to rotate the same clockwise and release the catch 40 on the bolt-like member from the hook-like formation on the latch 41. The cam member 45 is in the form of a V-shaped bar fixed to the outer end of a threaded rod 47, the other end of which is threaded into a suitable threaded bore in the bracket D. The bar is so positioned that the ends thereof make an arcuate angle relative to the path of travel of the transfer bridge and the upper arm of the latch 41 as a camming surface adapted to engage therewith and trip the latch as the rails are aligned.

Safety stops in the form of members or levers 50, 52 pivoted to the track sections adjacent to their open ends and adapted to normally lie in the path of the wheels of the carriers, are provided to prevent the carrier wheels and in turn the carriers from accidentally rolling from the ends of the rails 11 or 16 in the event the other rail is not aligned therewith. These stops are adapted to be automatically raised and lowered when the rails are aligned by movement of the bolt-like member 22 to its locking and retracted positions. The lever 50 is forked or split and the yoke thereof is pivoted to a depending web 53 on the bolt-like member 22 by a pin 54, with the legs of the lever straddling the web of the girder 10 and the free ends of the lever normally resting on the lateral flanges of the rail 11 in the path of carrier wheels traveling on the rail. As bolt-like member 22 moves forwardly to interlock with casting D, the portion 55 of the forked lever 50 strikes the adjacent edge of casting D or plates 18, which swings the legs of the lever upwardly about the pivot 54 as shown in Fig. 3. The stop at the adjoining end of the rail 16 comprises the two levers 52 pivoted to casting D, one on either side thereof by a pin 56. Each of these levers is provided with a projection 57 having an abutment surface or edge 58 which is engaged by the bolt-like member 22 as it moves forwardly to swing the levers upwardly, as shown in Fig. 3.

Each of the levers 52 at opposite sides of the web of the member D has a relatively short lever 60 pivotally connected thereto intermediate its ends by pivot pins 61 fixed to the levers 60 and rotatably secured in suitable apertures in the levers 52. The levers 60 are connected together by a rod or shaft 62 fixedly pinned thereto adjacent to the ends thereof remote from the pivots 61. The shaft 62 projects through an arcuate slot 63 in the member D. The construction of the parts just described is such that as the levers 52 are raised so that the wheels of a carrier can pass thereunder the levers 60 are moved into a position in which they are substantially horizontal and project from the levers 52 towards the right as viewed in the drawings, that is, towards the lever 50. When in this position they prevent the dropping of the levers 52 and release of the track interlock while a wheel of a carrier is thereunder, that is, in a position between the levers 50 and 52. If it were not for the levers 60, the track interlock could be released with a carrier wheel in the position referred to and in that event the transfer bridge could be moved away from the stationary track and at least one end of the carrier could be moved off of the end of the rail 16.

With the safety mechanism or levers 50, 52, 60 in the position shown in Fig. 3 and the aligned rails 11, 16 of the transfer bridge A and stationary track B securely locked in alignment, carriers may be safely moved from one rail to the other, with their wheels passing underneath the levers. The bolt-like member 22 cannot be retracted and the rails unlocked or released from one

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another with a carrier wheel located any place between the ends of the levers 50, 52, that is, with a carrier wheel underneath any of the safety stops or levers 50, 52, 60.

This is accomplished with respect to the stationary track B by two arcuate projections 65, one on each of the levers 52, which project into apertures 66 in the bolt-like member 22 as the levers 52 are raised by the forward movement of the bolt-like member 22, that is, movement of the bolt-like member into locking position with an aligned rail.

The lower edges of the levers 52, 60 underneath which the carrier wheels normally pass, are such that they will engage a carrier wheel located on the end of the rail 16 any place between the left-hand end of the stop levers 52 and the right-hand end of the rail, as viewed in the drawings, and arrest further downward movement of the lever before the projections 65 have released the bolt-like member 22 or permitted its movement to the right sufficient to disengage the edge of the casting D. The base of the lever 50, that is, the part to which the legs of the lever are attached, is so constructed as to provide a surface 70 which abuts the end of the track girder 10 when the lever 50 is in its raised position, to thereby prevent retraction of the bolt-like member 22 with the lever in its raised position. The construction is such, however, that the surface 70 does not interfere with the normal operation of the bolt-like member 22 and the lever 50 unless a carrier wheel is underneath the lever 50. The lever 50, as shown, has laterally projecting flanges 71 which are adapted to engage the treads of the wheels of the carriers but underneath which the wheels normally pass.

From the foregoing, it will be apparent that the objects and the advantages heretofore enumerated as well as others have been achieved, and that there has been provided an overhead monorail system having locking mechanism for a transfer or traveling bridge which will prevent movement of the bridge relative to an adjoining track with a carrier thereon and in such a position that it, or a wheel thereof, can be moved off the end of the track.

While the preferred embodiment of the invention has been described in considerable detail, I do not wish to be limited to the particular construction shown which may be varied within the scope of the invention, and it is the intention to cover hereby all adaptations, modifications and arrangements thereof which come within the practice of those skilled in the art to which the invention relates.

Having described my invention, I claim:

1. In an overhead carrier system a supporting structure, a first carrier rail connected to said supporting structure, a transfer bridge structure, a second carrier rail connected to said transfer bridge structure, said bridge structure transporting said second carrier rail connected thereto transversely of and into end-to-end alignment with said first rail, locking means for securing said rails in end-to-end alignment comprising a bolt-like member slidably mounted upon one of said structures for movement into and out of engagement with the other of said structures, a first stop member pivotally connected to the other of said supporting structures for movement into and out of the path of the wheels of a carrier on said rails, said bolt-like member engaging said first stop member and moving it about its pivot and out of the path of the carrier wheels when said bolt-like member is engaged with said other structure, said first stop member and said bolt-like member having cooperating means engageable with one another upon said movement of said first stop member for preventing movement of said bolt-like member in a direction to disengage said other structure, a second stop member pivotally connected to said bolt-like member and having a portion thereof engageable with said other structure upon movement of said bolt-like member into engagement with said other structure for camming said second

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stop member about its pivot and out of the path of the carrier wheels, said second stop member in its raised position having a surface thereof engageable with the said structure upon which said bolt-like member is mounted for preventing movement of said bolt-like member in a direction to disengage said other structure, and a lever 5 operatively connected to said first stop member and to said supporting structure to which it is pivoted for spanning the space between said stop members when said bolt-like member is engaged with said other structure and preventing lowering of said first stop with a wheel intermediate said stops.

2. In an overhead carrier system a supporting structure, a first carrier rail connected to said supporting structure, a transfer bridge structure, a second carrier rail 15 connected to said transfer bridge structure, said bridge structure transporting said second carrier rail connected thereto transversely of and into end-to-end alignment with said first rail connected to said supporting structure, locking means for securing said rails to end-to-end alignment comprising a bolt-like member slidably mounted 20 upon said transfer bridge structure, said bolt-like member having a notch for receiving a portion of said supporting structure to interlock said structures when said rails are aligned and an abutment surface adjacent to said notch, a first stop member pivotally connected to said supporting structure for movement into and out of the path of the wheels of a carrier on said rails, said bolt-like member engaging said first stop member and moving

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the same about its pivot and out of the path of the carrier wheels when said bolt-like member is engaged with said supporting structure, said first stop member having means engageable with cooperating means on said bolt-like member upon said pivotal movement of said first stop member preventing movement of said bolt-like member toward released position, a second stop member pivotally connected to said bolt-like member and having a portion thereof engageable with said supporting structure upon 10 movement of said bolt-like member into engagement with said supporting structure for camming said second stop member about its pivot and out of the path of the carrier wheels, said second stop member in its raised position having a surface thereof engageable with the said bridge structure for preventing movement of said bolt-like member in a direction to disengage said supporting structure, and a lever operatively connected to said first stop member and to said supporting structure for spanning the space between said stop members when said bolt-like member is engaged with said supporting structure and preventing lowering of said first stop member with a wheel intermediate said stops.

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