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ELEVATOR BRIDGE

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Fig-1

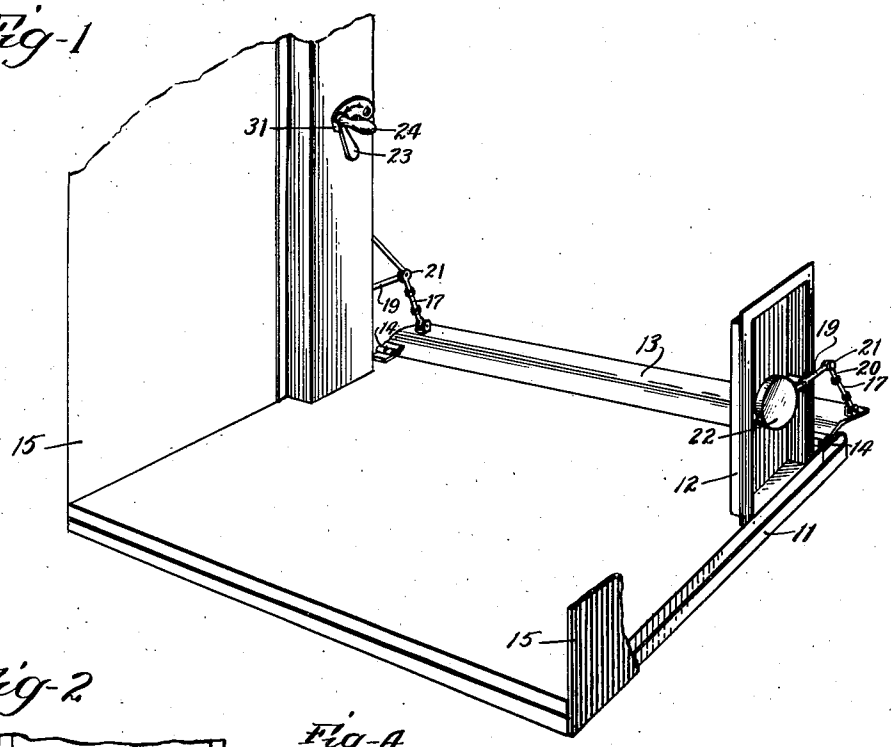


Fig-2

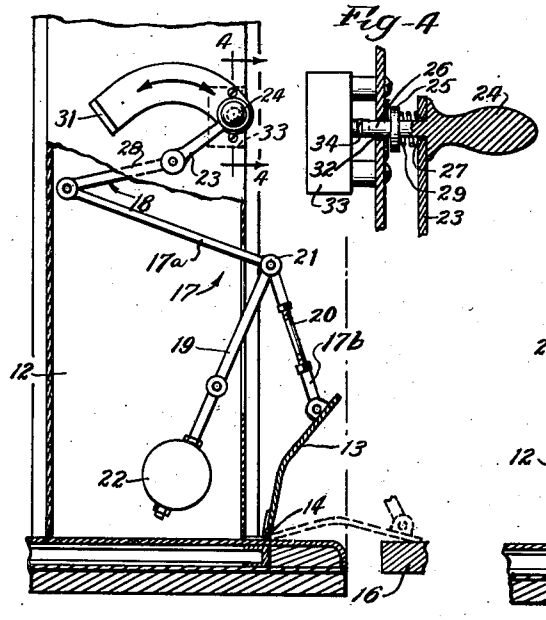
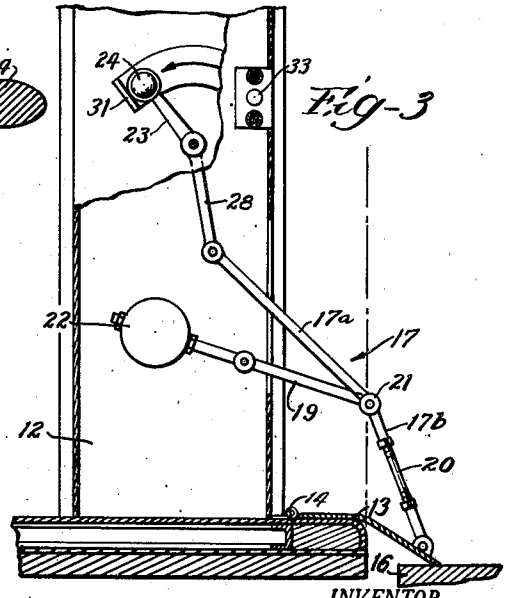


Fig-4

Fig-3



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ELEVATOR BRIDGE

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5 Claims. (Cl. 187—1)

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My invention pertains to elevators and more particularly to bridge means associated with an elevator adapted to bridge the gap normally existing between an elevator floor and a platform on approximately the same level. I am aware that those skilled in the art are already familiar with various devices of this nature as well as with the necessity for such devices and the usages thereof. My improved elevator bridge provides certain new and novel arrangements compared to prior devices which greatly increase the safety of the elevator and increase the ease of installation and operation.

One of the objects of my invention is to provide an elevator bridge mechanism of the type herein described which is associated with the elevator mechanism in such manner that movement of the elevator while the bridge is in a lowered position is prevented.

Among the other objects of my invention is the provision of improved mechanical means for actuating the elevator bridge and for increasing the ease of installation of such mechanisms in existing elevators. These and other objects will become apparent from the following specification and accompanying drawing in which

Figure 1 is a partially sectioned perspective view of an elevator showing the general assembly of the bridge;

Figure 2 is a partially sectioned view indicating the position of the operating mechanism when the bridge is in a raised position;

Figure 3 is similar to Figure 2 indicating the position of the mechanism when the bridge is in a lowered position; and

Figure 4 is a partially sectioned view illustrating the preferred arrangement of the operating handle and cut-out switch.

Referring to Figure 1, an elevator having a floor member 11 is provided with upwardly extending channel shaped housings 12 attached to an elevator wall 15 adjacent the front of the elevator. The housings 12 face outwardly forming a hollow section which contains a substantial portion of the operating mechanism. A bridge 13 is attached to the floor 11 by hinges 14, or other suitable means, a short distance inwardly from the front edge of the floor and preferably extends laterally the full length of the floor member 11, being sufficiently wide to bridge the gap normally existing between the car and an adjacent platform 16. The outer edge of the bridge 13 is beveled to permit loaded trucks or other vehicles to ride easily over the edge. The bridge

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13 is arched, the peak of the arch being generally parallel to the edge of the floor member 13.

A hinged rod connection or mechanism 17 is pivotally attached to the bridge 13 adjacent its outer edge and is also pivotally attached to one extremity of a bell crank 18. A lever 19 is pivoted to the outer face of the housing 12, a portion of the lever extending outwardly beyond the edge of the housing and being pivotally secured to the rod connection 17 at the hinge 21. The edge of the housing 12 is cut away to permit movement of the lever 19. The other end of the lever 19 supports an adjustable counterweight 22, the assembly including a counterweight 22 and the lever 19 being so constructed and arranged that no portion of the mechanism projects outwardly beyond the edge of the elevator floor 11, thereby eliminating the need for additional clearance in the elevator shaft.

Rod connection 17 is formed in two pieces 17*a* and 17*b* joined at the pivotal connection 21 with the lever 19. The point 21 at which the lever 19 is connected to the rod connection 17 is selected to position the lever 19 approximately parallel to the bridge 13. The mass and the position of the counterweight 22 is then selected to balance the weight of the bridge. Since the bridge 13 and the lever 19 are approximately parallel, the moment of the counterweight 22 about its pivot will then be approximately equal to the moment of the bridge 13 about its hinges 14 in substantially any position of the bridge since in each case the moment decreases as the bridge is brought from a lowered to a raised position and increases when moved in a reverse direction.

For convenience in installation, the rod connection 17 is made adjustable in length. For example, the rod connection 17 may be divided and suitably drilled axially and tapped to receive an adjusting rod 20, having opposite threads at each end whereby rotation of the adjusting rod 20 lengthens or shortens the distance between the bridge and pivot point 21.

The bell crank 18 is journalled in one of the housings 12, extending through the housing at its journal point. One arm 23 of the crank 18 is disposed within the elevator car and the other arm 28 within the housing 12 for connection to the operating mechanism.

It is to be understood that the herein described mechanism may be provided in parallel on any elevator car, that is, the mechanism may be duplicated on each side of the elevator in corresponding housings 12. Normally, however, this constitutes an unnecessary expense and therefore only a

portion of the mechanism comprising a portion of the rod connection 17, the lever 19 and the counterweight 22 with their accompanying pivots are provided on the side opposite that bearing the actuating mechanism. This type of arrangement is illustrated in Figure 1.

An extremity of the arm 23 is provided with a handle 24 having an axially aligned pin 26 rigid therewith. The pin 26 extends through an opening 27 formed in an extremity of the arm 23 and is mounted for reciprocable movement therein. A collar 25 is secured to the pin 26 a short distance inwardly from the arm 23 and a spring 29 is interposed between the arm 23 and the collar 25 to normally urge the handle 24 and the pin 26 outwardly.

A stop member 31 may be formed on the housing 12 to limit the travel of the arm 23 in one direction. At the other end of the arc of the handle 24, i. e., the raised position, an opening 32 is formed in the housing 12 to receive the pin 26. A switch 33 having an operating plunger 34 is attached to the housing 12 with the plunger 34 aligned with the opening 32 in such manner that the pin 26 may extend through the opening 32 into contact with the plunger 34 and under the pressure of the spring 29, force the plunger inwardly to complete the circuit through the switch. The switch 33 may suitably be of a spring-actuated normally open type.

While the foregoing disposition of parts constitutes the preferred embodiment of my invention, it is to be understood that the switch 33 may be actuated by other portions of the bridge operating mechanism as, for example, by the other arm 28 of the bell crank 18. It is also obviously possible, where desired, to use a normally closed spring-actuated switch in place of the normally open type of switch whereby movement of the bridge actuating mechanism would hold the switch open except when the bridge 13 is in raised position.

Since most elevators today are operated by electric power, I have described the use of a switch 33 in connection with my invention. Since the switch operates to positively interrupt the power supply to the elevator means, it is apparent that the elevator cannot be moved except when the bridge member 13 is in raised position. On elevators powered by other means such as hydraulic, various obvious modifications may be made; for example, an auxiliary electric circuit operating power control means may be provided and would include the switch 33 as a part of the circuit, or, alternatively, a valve could be provided in place of the switch 33 interrupting the hydraulic power to the elevator.

One of the principal advantages of my device is that no portion of the mechanism extends outwardly beyond the cube of the elevator in any direction, either vertically or laterally, and provision, therefore, need not be made for either side or pit clearance with the attendant possibility of damage to the mechanism in case of improper operation.

Failure to align the elevator properly at floor level, or minor movement of the elevator as the load increases or decreases will not unduly strain the bridge, since the arched bridge construction permits the free end of the bridge to contact the floor or platform even when the elevator is somewhat above or below the floor level. Even in the event the elevator is substantially above the floor level, the operating mechanism will not be severely strained by use since the arch is disposed in such manner as to permit the underside of the bridge to come to rest on the elevator floor.

My improved linkage provides a continuous, even counterbalance for the bridge in any position and, in addition, my device will positively prevent accidental or inopportune operation of the elevator.

In compliance with section 4888 of the Revised Statutes, I have illustrated and described herein a preferred form of my invention, but it is obvious that many modifications may be made in the details herein described by those skilled in the art without departing from the true spirit and scope of my invention. I do not therefore wish to be limited to the precise details herein described except in so far as defined by the appended claims.

Obviously, the same device could be used advantageously at loading docks or the like where the space between two platforms must be bridged.

I claim:

1. For use with an elevator car having a floor and means for moving the car, a bridge pivotally secured to the floor of the car adjacent one edge thereof, said bridge being of such dimension as to extend outwardly when in lowered position beyond the edge of the car to bridge a gap between the car and a platform, upright members attached to the floor of the car, a crank arm pivoted to one of said members, a rod mechanism pivotally connected to an extremity of said crank and to said bridge means, a lever pivoted to said member and pivotally connected to said rod mechanism, said bridge means and said lever being substantially parallel in all positions, and a counterweight on the opposite end of said lever, the moment of the counterweight about its pivot being substantially equal to the moment of the sill about the hinge.

2. For use with an elevator car having a floor, members within the cube of the elevator extending upwardly from the floor, a housing within the car attached to one of said members, a bridge pivotally secured to the floor of the car adjacent one edge thereof, said bridge being of such dimension as to extend outwardly when in lowered position beyond the edge of the car to bridge a gap between the car and the platform, a bell crank journalled through said housing having an outer arm and an inner arm, a rod mechanism pivotally connected to said bridge and to said inner arm, a lever pivoted to the side of the housing and pivotally connected to said rod mechanism, a counterweight on the other end of said lever, the length of said lever being such as to permit movement of the counterweight within the channel, the lever being substantially parallel to the bridge in all positions whereby the moment of the counterweight about the pivot of the lever may be made substantially equal to the moment of the bridge about the hinge, said assembly being characterized by the absence of bridge operating mechanism projecting outwardly beyond the cube of the car in any direction.

3. For use with an elevator car having a bridge hinged to the floor of the car adjacent to one edge thereof, said bridge being of such dimension as to extend outwardly beyond the edge of the car when in lowered position to bridge the gap between the car and a platform, manually operating bridge-actuating means including a pivoted lever, and a counterweight attached to said lever, said lever and said bridge being substantially parallel in all positions whereby the moment of

the counterweight about the pivot of the lever is substantially equal to the moment of the bridge about its hinge.

4. A bridge for spanning the gap between two platforms, one of which is movable relative to the other, comprising an upright member secured to one of the platforms and extending above the floor thereof, a bridge pivoted adjacent its inner margin to said one platform and adapted when lowered to span the gap between the two platforms, a counterbalancing mechanism for the bridge mounted at least in part on said upright member and comprising a lever pivoted on said upright member and having one end connected to the bridge adjacent is outer margin and having a counterweight on the other end of the lever, the arrangement of pivots and lever arms being such that said lever and bridge are substantially parallel at all times with the moment of the counterweight about its pivot being substantially equal to the opposed moment of the bridge about its pivot.

5. A bridge for spanning the gap between two platforms, one of which is movable relative to the other, comprising an upright member secured to one of the platforms and extending above the floor thereof, a bridge pivoted adjacent its inner

margin to said one platform and adapted when lowered to span the gap between the two platforms, a counterbalancing mechanism for the bridge mounted at least in part on said upright member and comprising a lever pivoted on said upright member and having one end connected to the bridge adjacent its outer margin and having a counterweight on the other end of the lever, the arrangement of pivots and lever arms being such that said lever and bridge are substantially parallel at all times with the moment of the counterweight about its pivot being substantially equal to the opposed moment of the bridge about its pivot, and a crank arm pivotally mounted on said upright member and operatively connected to the bridge for moving the bridge to and from its lowered position.

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