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ELEVATING MEANS FOR CAR DOORS

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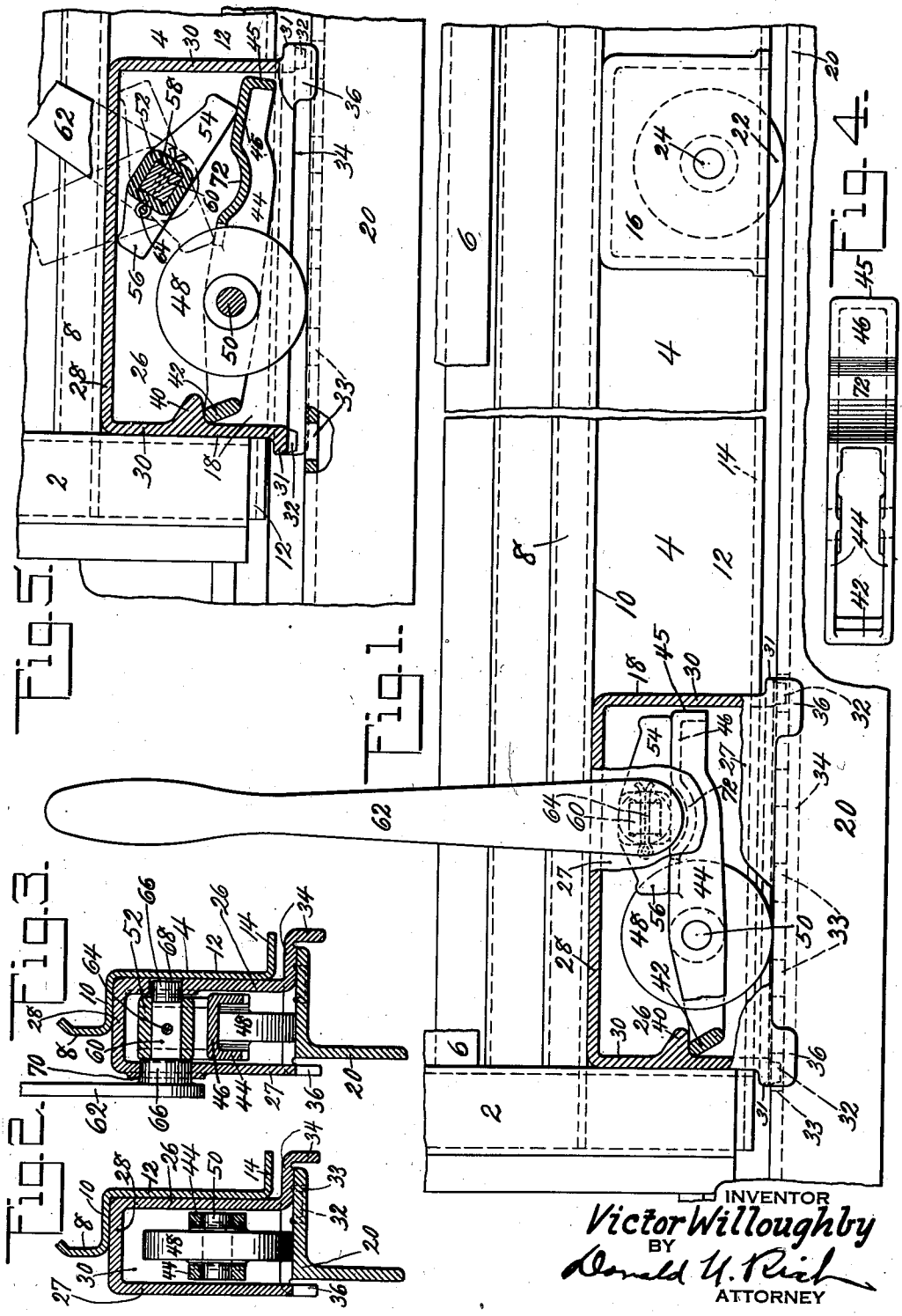

Fig. 1.

Fig. 5.

Fig. 3.

Fig. 2.

Fig. 4.

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ELEVATING MEANS FOR CAR DOORS

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5 Claims. (Cl. 16—99)

This invention relates to door elevating means in general and in particular to such means as used in connection with sliding doors on railway freight cars.

The majority of freight cars now equipped with lift devices utilized devices of the type lifting both edges of the door simultaneously, but the use of such simultaneous lift devices is expensive and in many cases unsatisfactory, for it is necessary to use a relatively large amount of material in providing the necessary linkages and the entire weight of the door must be lifted. With the simultaneous lifting of both edges of the door it is possible for the door to lift vertically and slide along the seal strips without breaking the sealing contact, thus making the door exceedingly hard to open and requiring either pry bars or a separate and distinct starting device to initiate movement of the door. It is an object, therefore, of the present invention to provide a door with a lift device which will tilt the door during lifting, thereby breaking the sealing contact between the door and seal strips and obviating the use of a separate starter.

A further object of the invention is the provision of a door elevating mechanism which is simple in structure and which need lift but half the weight of the door.

A still further object of the invention is the provision of a simple elevating means for doors which automatically lowers the doors upon the supporting trackway and positively prevents any sliding movement between the door and track.

These and other objects of the invention will be apparent to persons skilled in the art from a study of the following description and accompanying drawing, in which:

Figure 1 is a partial elevational view showing the lower portion of a car door with the improved lift device applied thereto, part of the device being shown in section to more clearly disclose the construction;

Fig. 2 is a sectional view taken through the elevating mechanism adjacent the roller axle;

Fig. 3 is a sectional view through the elevating means substantially at the operating handle;

Fig. 4 is a plan view of the roller carriage, and

Fig. 5 is a sectional view of the elevating means similar to Figure 1 but showing the door in lifted position.

Referring now to the drawing in detail, it will be seen that the elevating means has been applied to a conventional door having angular formed front stile **2** joined to an angular formed bottom rail **4** and to a door panel **6**. The bottom rail is preferably formed with a corrugation **8** joined to a Z form lower portion having the equivalent of an upper flange **10**, web **12** and lower flange **14**. The web **12** and flange **10** provide an admirable location for attachment of the door supporting roller housings **16** and **18** respectively, by means of which the door is supported for movement relative to the door track **20**. The roller housing **16** is of box form and carries therein a roller **22** rotatable on axle **24** carried by the roller housing against any shifting movement and with the roller so positioned as to support the lower edge of the housing and door above the door track at all times.

The roller housing **18**, located adjacent the forward edge of the door, is of general box formation having inner and outer side walls **26** and **27** respectively, joined at their upper edges by top wall **28** and at their ends by end walls **30**. The lower edge of each of the end walls preferably terminates in a rigidifying flange **31**, upon which is formed a lug or projection **32** adapted to fit within openings **33** formed in the upper surface of the track adjacent its inner edge and substantially beneath the inner wall of the roller housing. The lower edge of the inner wall of the roller housing is provided with an angular flange **34**, while the outer wall is extended as at **36** in order to straddle the track and prevent sidewise shifting of the door relative to the track upon which it is supported.

One of the end walls of the roller housing is provided with a ledge or projection **40** adapted to be engaged by the rounded upper edge **42** of a cross bar connecting the side pieces **44** of the roller carriage. The side pieces of the roller carriage are also connected together by a second cross member **45** and a partial top web **46**. This top web is discontinuous in order to receive roller **48** journaled on axle **50** carried in reinforced openings in the side pieces of the roller carriage and of such a length as to extend through the carriage side pices. This roller carriage is of such a length that the cross piece **42** may engage under the ledge **40**, while the second cross piece **45** will be positioned closely adjacent the end wall **30** of the housing which is opposite the end wall carrying the ledge. In order to operate and cause shifting of the roller carriage, a roller carriage shifting member **52** is provided having unequal length arms **54** and **56** respectively projecting in opposite directions from a central hub, through which a preferably square opening **58** extends. This opening is adapted to receive squared portion **60** rigidly carried by a door oper-

ating handle 62. The squared portion of the operating handle is preferably pin connected as at 64 to the hub portion of the roller carriage shifting member and is formed on either side of the squared portion, with rounded portions 66 having bearing in openings 68 and 70 formed in the inner and outer walls respectively of the roller housing. As clearly shown in Figures 1, 3 and 5 the connecting web 46 of the roller carriage has a portion depressed as at 72 in order to clear the hub portion of the roller carriage shifting member.

It will be seen from the preceding description that the door is supported at one edge upon an axle fixed with respect to the door, while at the other edge it is supported upon an axle which may be shifted relative to the door. It will also be seen that the roller and roller carriage is free of the roller housing and supports the door only at such times as the operating handle has been moved to permit one of the arms 54 or 56 to shift the carriage, rocking the same about the axle and lifting the door through the cross member 42 and ledge 40. When the door is in its normal position, as shown in Figure 1, the lugs 32 on the housing will engage in the openings in the track member and prevent any sliding movement of the door. The housing is so designed that when the door is supported, as shown in Figure 1, the rail edge will be substantially parallel to the track, while the stiles will be parallel to the sealing strips. It should be noted that the parts are so proportioned that the roller and roller carriage are entirely free of door weight when the door is in its normal position, but it should be noted that even though inaccuracies appear in the structure and a part of the weight is still supported on the roller, the door cannot shift due to the lugs 32 being in engagement with the track openings. In this manner expensive machining and fitting of the parts is eliminated. When it is desired to lift the door, the handle 62 is grasped and pulled in either direction, preferably in the direction of door opening movement, thus causing either arms 54 or 56 to force the adjacent end of the roller carriage downward, rocking the carriage about axle 50 as a fulcrum and lifting the door through the cross bar 42 and ledge 40. In this manner a powerful leverage of the first class is obtained for lifting the door, and the parts are so proportioned that the door will automatically lower as soon as pressure is released from the operating handle. The arms 54 and 56 are made of unequal length in order that the movement of the roller carriage will be substantially constant regardless of the direction of movement of the operating handle, while at the same time giving as nearly as is possible a constant leverage ratio. Attention is directed to the fact that it is impossible to move the operating handle to such a position as to lock the door in raised position, due to the fact that the arms which are not in use on the carriage shifting member will engage the top wall of the housing as clearly shown in Fig. 5.

While the invention has been described more or less in detail, it will be obvious to persons skilled in the art that various modifications and rearrangements of parts may be made and all such modifications and rearrangements of parts are contemplated as will fall within the scope of the appended claims which define my invention.

What is claimed is:

1. In an elevating means for car doors the combination of a roller, an axle extending through the roller, a roller carriage rockably carried by said axle, a roller housing secured to the car door and substantially inclosing said roller carriage, a projecting ledge in said housing overlapping a portion of said carriage, said carriage engaging said housing in free abutting relation with said projecting ledge, and operating means overlapping another portion of said carriage and shiftable to cause rocking movement of the carriage about said axle.

2. In an elevating means for car doors the combination of a roller, a roller axle, a roller carriage rockably carried by said axle, a roller housing secured to the car door and substantially inclosing said roller carriage, a projecting ledge interiorly of said roller housing and overlapping one end of said roller carriage, said carriage engaging said housing in free abutting relation with said projecting ledge, and rotatable operating means overlapping the other end of said roller carriage, said rotatable operating means having oppositely projecting arms bearing on said roller carriage and causing rocking movement of said roller carriage about said axle irrespective of the direction of rotation of said operating means.

3. In an elevating means for car doors the combination of a roller, a roller axle, a roller carriage rockably carried by said axle, a roller housing secured to the car door and substantially inclosing said roller carriage, a projecting ledge interiorly of said roller housing and overlapping one end of said roller carriage, said carriage engaging said housing in free abutting relation with said projecting ledge, roller carriage shifting means rotatably carried by said housing and formed with oppositely projecting arms overlapping but in free abutting relation with the other end of said roller carriage, and an operating lever connected to said means to rotate the same thereby causing one of said arms to force said other end of the roller carriage downwardly irrespective of the direction of rotation of said means.

4. In an elevating means for car doors the combination of a housing carried by the door adjacent the lower edge thereof, said housing being formed with a downwardly directed lower opening, a roller carriage assembly freely insertable into said housing through said lower opening and comprising a roller and a roller axle rockably supporting the roller carriage, a ledge projecting interiorly of said housing, one end portion of said roller carriage underlapping said ledge and being normally in free abutting engagement therewith, and operating means carried by the housing and so arranged as to freely engage the other end of the roller carriage assembly to limit upward movement thereof within the housing, said operating means including an element so formed and arranged relative to said roller carriage as to cause rocking movement of the roller carriage assembly about the axle upon shifting movement thereof in either of two directions.

5. In an elevating means for car doors the combination of a housing secured to the door and having a downwardly directed lower opening, a roller carriage assembly comprising a roller and a roller axle rockably supporting the roller carriage, said roller carriage being freely insertable into said housing through the lower opening and free of connection with the housing, a ledge projecting interiorly of said housing, one end portion

of said roller carriage underlapping said ledge and being normally in free abutting engagement therewith, roller carriage assembly shifting means rotatably carried by said housing, said shifting means being formed with a projecting arm located within the housing and overlapping the other end of said roller carriage in free abutting relationship, and an operating lever connected to said shifting means to rotate the latter and cause said projecting arm to force said other end of the roller carriage downwardly within the housing.

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