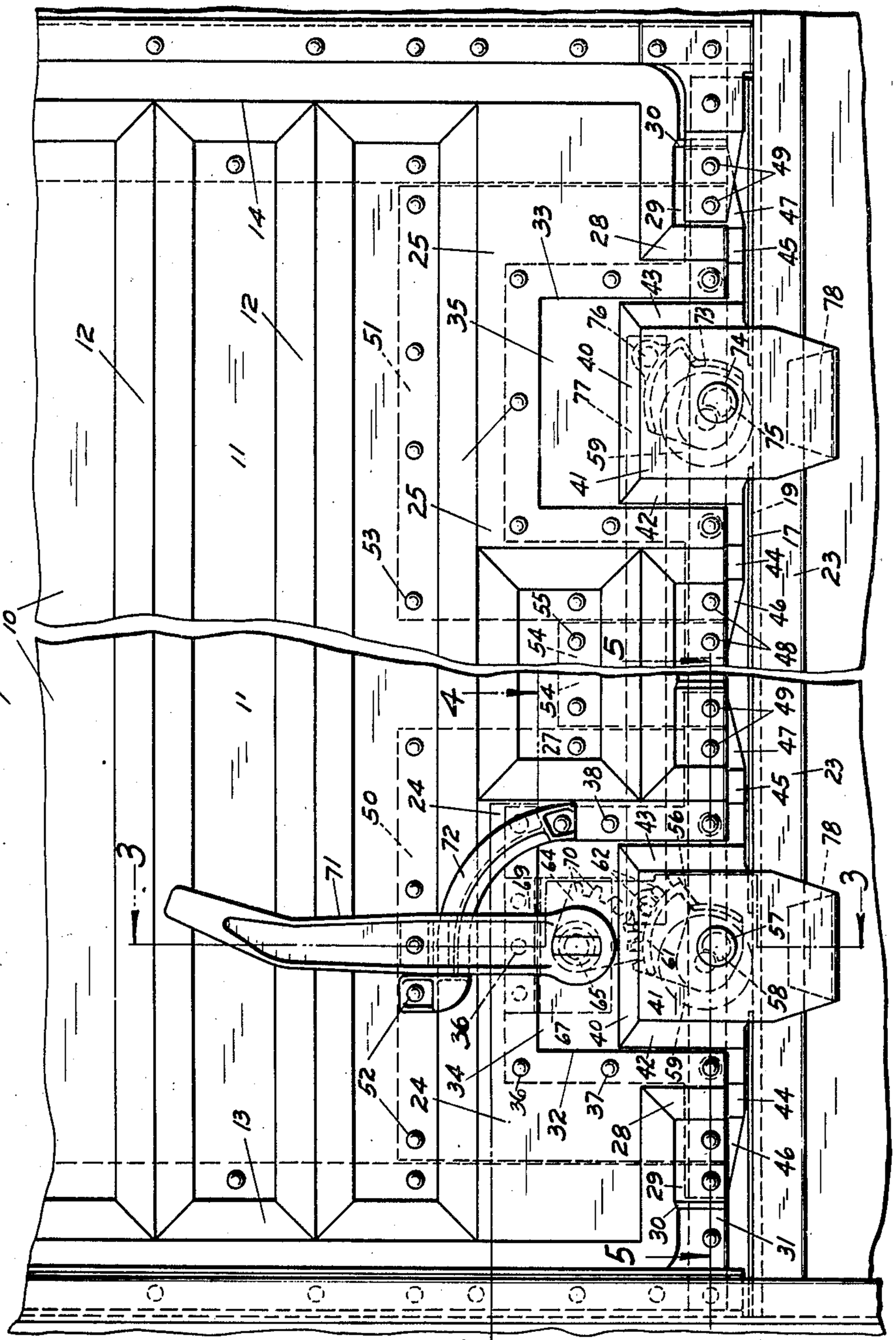
March 7, 1944. W. A. BEAUCHAMP 2,343,361

CAR DOOR MECHANISM

Filed Jan. 7, 1942 3 Sheets-Sheet 1

FIG-1



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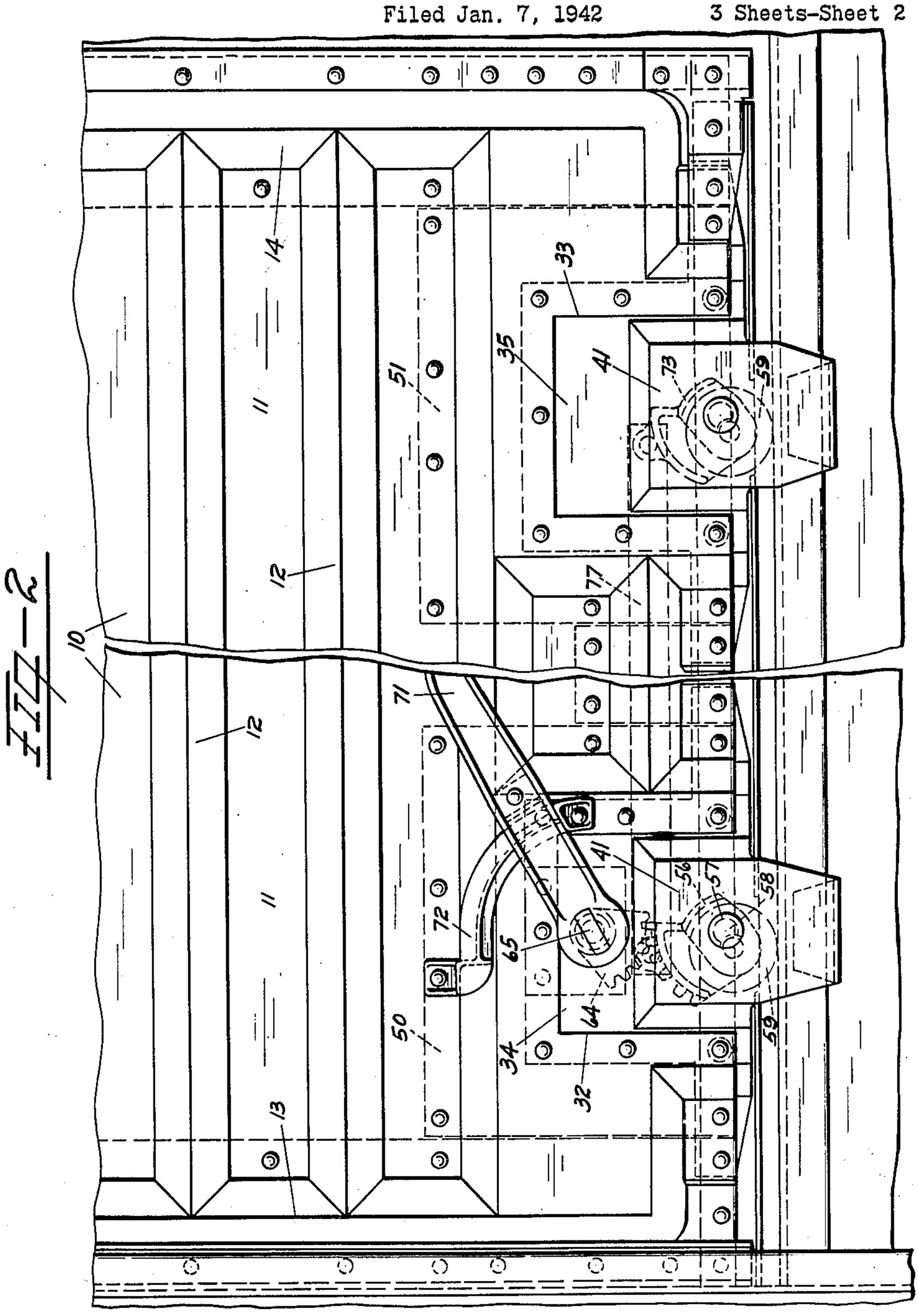
Filed Jan. 7, 1942 3 Sheets-Sheet 2



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Filed Jan. 7, 1942 3 Sheets-Sheet 3

FIG-4

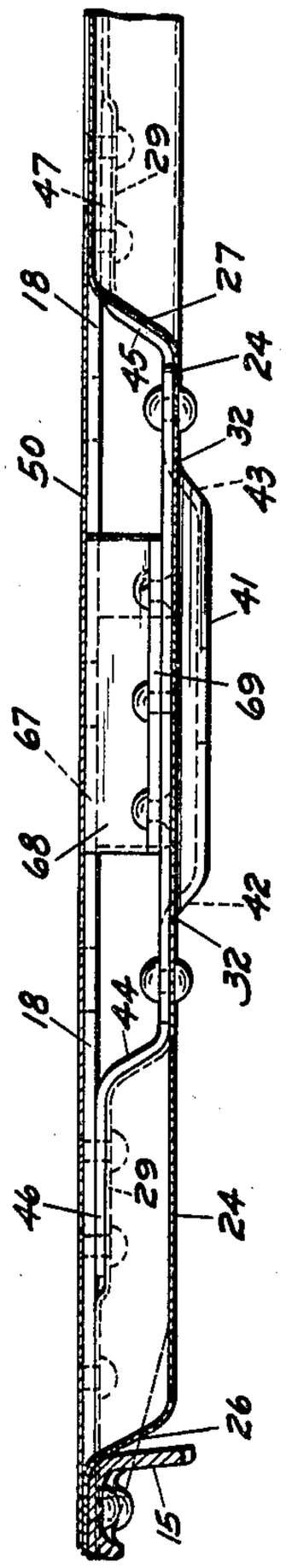


FIG-5

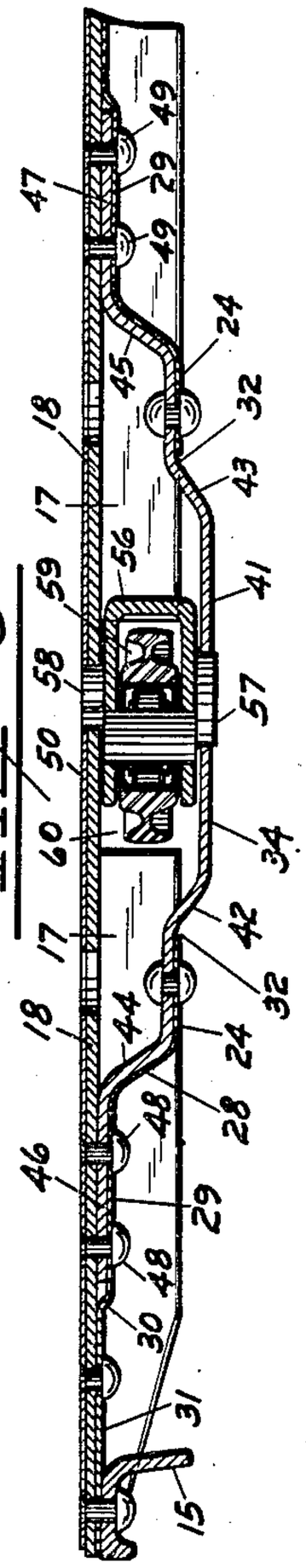
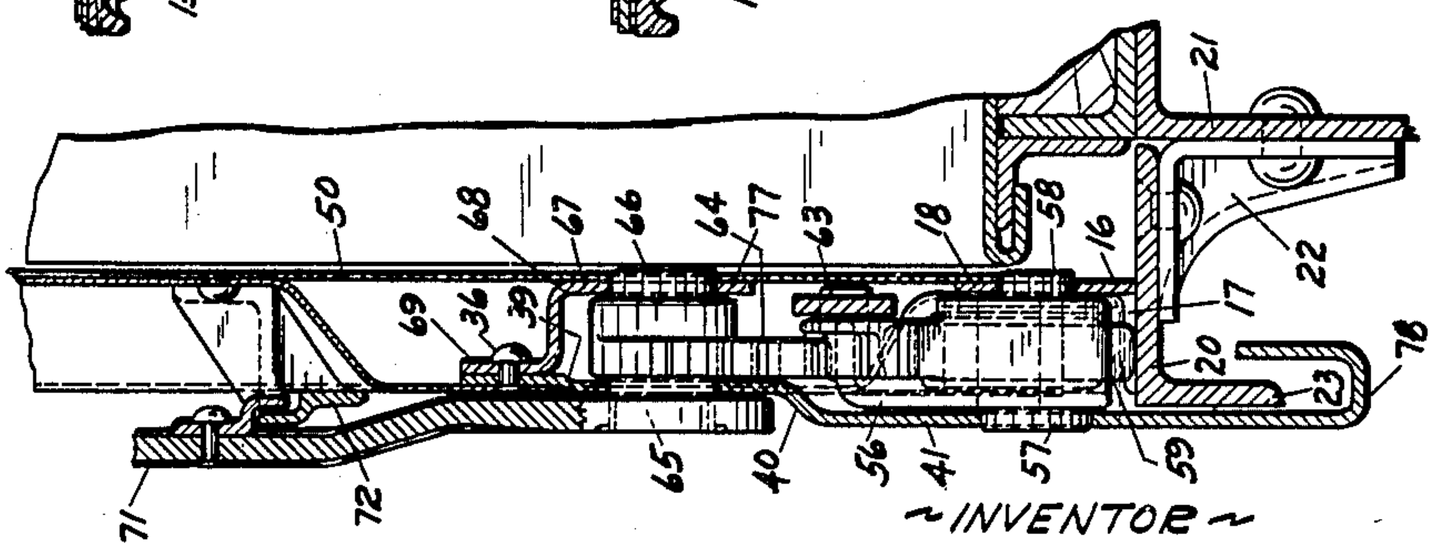


FIG-3



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2,343,361

CAR DOOR MECHANISM

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Application January 7, 1942, Serial No. 425,901

3 Claims. (Cl. 16—99)

This invention relates to car door mechanism and is directed primarily to mechanism for lifting frictionally supported sliding car doors and supporting said doors upon antifriction means for opening and closing movements.

It is an object of this invention to provide door mechanism of the character indicated which shall be so compact that it can be used upon cars of varying widths without exceeding the established tunnel clearance lines.

A further object is to provide door mechanism of the character indicated which shall project a shorter distance from the doors to which it is applied than similar mechanisms now in use and thus obtain an increase in the inside width of cars without exceeding the established tunnel clearance lines.

A further object is to provide mechanism of the character indicated which shall be novel and simple in structure and easily operable.

Other objects of the invention will become clear as the description thereof proceeds.

In the drawings forming part of this specification:

Fig. 1 is a partial elevation of a car door to which mechanism embodying the present invention is applied, the door being shown in lowered position.

Fig. 2 is a view similar to Fig. 1, the door being shown in elevated position.

Fig. 3 is a vertical section taken on line 3—3 of Fig. 1.

Fig. 4 is a horizontal section taken on line 4—4 of Fig. 1, the lift mechanism being omitted for the sake of clarity.

Fig. 5 is a horizontal section taken on line 5—5 of Fig. 1.

The mechanism embodying the instant invention is shown applied to a sliding metallic door the construction of which, with the exception indicated hereinafter, is well known. The door indicated generally by the reference numeral 10 comprises a metallic panel 11 formed with a plurality of spaced horizontal corrugations 12 which merge into vertical corrugations 13 and 14 formed adjacent the vertical edges of the panel. The front vertical margin of the panel is reinforced by means of a substantially channel shaped member 15. The lower margin of the panel is reinforced by means of an angle member 16 disposed so that one leg 17 thereof is horizontal and the other leg 18 is vertical. The horizontal leg 17 is adapted to frictionally engage the horizontal leg 19 of an angle track 20 which is fastened to the side sill 21 of the car by means of a plurality of brackets 22 riveted to the side sill and to the horizontal leg 19 as more clearly shown in Fig. 3 of the drawings. The vertical leg 23 of the angle track extends downwardly for a purpose which will hereinafter appear.

Portions 24 and 25 of the panel are offset outwardly to a plane corresponding substantially to that of the crest of the horizontal and vertical corrugations. From Figs. 1 and 4 of the drawings it will be seen that the left side of the portion 24 of the panel along the section line 4—4 merges into the crest of the vertical corrugation 13 as indicated at 26 and the right side is connected with the main plane of the panel by the outwardly and forwardly inclined section 27. The portion 24 along the section line 5—5 is offset inwardly as indicated at 28 to provide a portion 29. The portion 29 is offset inwardly as indicated at 30 to provide a portion 31 lying substantially in the main plane of the panel. At the opposite side the panel portion 24 along the section line 5—5 is formed similar to the structure immediately above described. This structure is more clearly illustrated in Fig. 5 of the drawings.

The portion 25 of the panel is shaped similar to the portion 24 and it is believed that a further detailed description of the configuration of the panel portion 25 is not necessary.

As clearly shown in the several views of the drawings the panel portions 24 and 25 are coped to provide rectangular openings 32 and 33. These openings are closed by means of formed plate members 34 and 35 which are similar in construction so that the description of one of them will suffice. While it is preferred to use formed plate members it is to be understood that the invention is not limited thereto but that cast or forged members may be used if desired.

The upper portion of plate member 34 is generally rectangular in shape and is secured as by means of horizontal rivets 36 and vertical rivets 37 and 38 to the panel portion 24. The plate 34 below the top of the opening 32 is offset outwardly as indicated at 39 so as to lie substantially in the plane of the portion 24 for a part of its height. The plate 34 is again offset outwardly as indicated at 40 so that the portion 41 of the plate below the offset 40 extends through the opening 32. The portion 41 at each side merges into the portion of the plate 34 which is secured to the inside of the offset panel portion 24 as indicated at 42 and 43 in Fig. 5. Each side of the plate 34 along the bottom

thereof is again offset inwardly as indicated at 44 and 45 and is then extended as shown at 46 and 47 so as to lie between the portions 29 of the panel portion 24 and the vertical leg 18 of the bottom reinforcing angle 16 to which they are secured as by means of rivets 48 and 49. These rivets serve additionally to fasten backing plates 50 and 51 to the vertical leg 18 of the bottom reinforcing angle, these backing plates being also secured to the panel 11 in the main plane thereof by means of rivets 52 and 53. A shorter backing plate 54 is fastened to the panel in the main plane thereof intermediate the backing plates 50 and 51 as by means of rivets 55 and by the rivets 48 and 49.

A roller retainer is journalled between the outwardly offset portion 41 of the plate 34 and the vertical leg 18 of the bottom reinforcing angle by means of trunnions 57 and 58. The retainer 56 carries a roller 59 the axis of rotation of which is offset relative to the axis of the trunnions as more clearly indicated in Figs. 1, 2 and 5 of the drawings. The roller 59 is adapted to engage the horizontal flange 19 of the track and for this purpose extends through a cope 60 formed in the horizontal flange of the bottom reinforcing angle.

The retainer 56 is formed with an upper curved wall 61 provided with a plurality of teeth 62 and carries a lug 63 hereinafter referred to.

A gear segment 64 is journalled between the portion of the plate 34 formed by the offset portion 39 and the main plane of the door by means of trunnions 65 extending through plate 34 and 66 extending through the depending leg 67 of a substantially Z-shaped bearing member 68 the upper flange 69 of which is secured to the plate 34 by means of the rivets 36. The teeth 70 of the gear segment 64 mesh with the teeth 62 of the roller retainer 56.

A lever 71 is mounted upon the trunnion 65 and is retained and guided in its movement by means of an arcuate quadrant 72 secured at its upper end in the main plane of the panel by means of one of the rivets 52 and at its lower end to the portion 24 of the panel by means of one of the rivets 38. As more clearly shown in Fig. 3 of the drawings the portion of the lever adjacent to trunnion 65 does not extend substantially beyond the offset portion 41 of the plate 34, thereby conserving a substantial amount of space which was required by the levers of the lift mechanisms now in use.

A roller retainer 73 is similarly journalled between the outwardly offset portion 41 of the plate 35 and the vertical leg 18 of the bottom reinforcing angle by means of alined trunnions 74 and 75. The retainer 73 also carries a roller 59 the axis of rotation of which is offset relative to the trunnions 74 and 75. A lug 76 is formed on retainer 73 is adapted to extend through one end of a connecting bar 77, the other end of which is similarly related to lug 63 formed on retainer 56. The connecting bar 77 insures simultaneous operation of the two roller retainers and by virtue of the described construction may be in the form of a flat strap since when effective it is subjected to tension rather than to compression.

The offset portions 41 of the plates 34 and 35 are extended downwardly below the track 20 and formed into hook-shaped members 78 which are adapted to embrace the depending flange 23 of the angle track to prevent accidental disengagement of the lower portion of the door from the track.

When the door is in lowered position so that the horizontal flange 17 of the bottom reinforcing angle 16 is frictionally seated upon the track 20 the parts of the lift mechanism are as illustrated in Fig. 1 of the drawings. To lift the door so as to transfer its weight to the rollers 59 the operating lever 71 is pulled downwardly in clockwise direction. Rotation is thereby imparted to the gear segment 64 which in turn causes counter-clockwise rotation of roller retainer 56 and elevation of the door. Corresponding rotation is imparted to roller retainer 73 through the connecting bar 77 so that uniform elevation of the door is obtained. When the door is elevated the parts of the mechanism are as illustrated in Fig. 2 of the drawings. Upon release of the lever at any point in the travel of the door the latter gravitates to frictional engagement with the track and the parts of the mechanism are again restored to the position shown in Fig. 1 of the drawings.

The mechanism hereinabove described is easy to operate and its structure obtains a substantial reduction in the projection of the mechanism outwardly of the door. Space is thereby conserved so that the mechanism is capable of use upon railway house cars of varying widths. A single standard lift mechanism is thereby secured. Moreover, the structure of the mechanism hereinabove described so reduces the overall width of the car through the mechanisms on opposite sides of the car that the inside width of the cars can be increased without placing any part of the mechanism beyond the tunnel clearance lines. A valuable increase in the cubical capacity of railway house cars is thereby obtained.

Numerous changes and modifications in the details of the invention will be clear to those skilled in the art. It is intended, therefore, that all such modifications and changes be comprehended within this invention which is to be limited only by the scope of the claims appended hereto.

I claim:

1. Lift mechanism for a sliding lift door comprising spaced rollers, retainers carrying said rollers, means adapted to journal said retainers on said door between the inner and outer planes thereof, said journal means being offset relative to the centers of said rollers, teeth on one of said retainers disposed inwardly of the outer face of said retainer, a gear segment adapted to be journalled on said door between the inner and outer planes thereof in meshing relationship with said retainer teeth, operating means mounted upon said gear segment outwardly thereof, and means connecting said retainers for simultaneous operation.

2. In a sliding door for railway house cars embodying a metallic panel, a gear segment journalled on said door, portions on said panel below said gear segment offset outwardly relative to said segment, roller retainers in said offset portions, rollers carried by said retainers, means journalling said retainers in said offset portions outwardly of the inner plane of said door, said means being offset relative to the centers of said rollers, teeth on one of said retainers, said gear segment meshing with said retainer teeth, a lever mounted upon said gear segment outwardly thereof, the lower portion of said lever extending outwardly not substantially beyond said off-

set portions, and means connecting said retainers for simultaneous operation.

3. In lift mechanism for a sliding door, a roller, a retainer carrying said roller, means adapted to journal said retainer on said door between the inner and outer planes thereof, said means being offset relative to the center of said roller, teeth on said retainer disposed inwardly of the outer face of said retainer, a gear segment adapted to be journalled on said door between the inner and outer planes thereof in meshing relationship with said retainer teeth, and an operating lever mounted upon said gear segment outwardly thereof.

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