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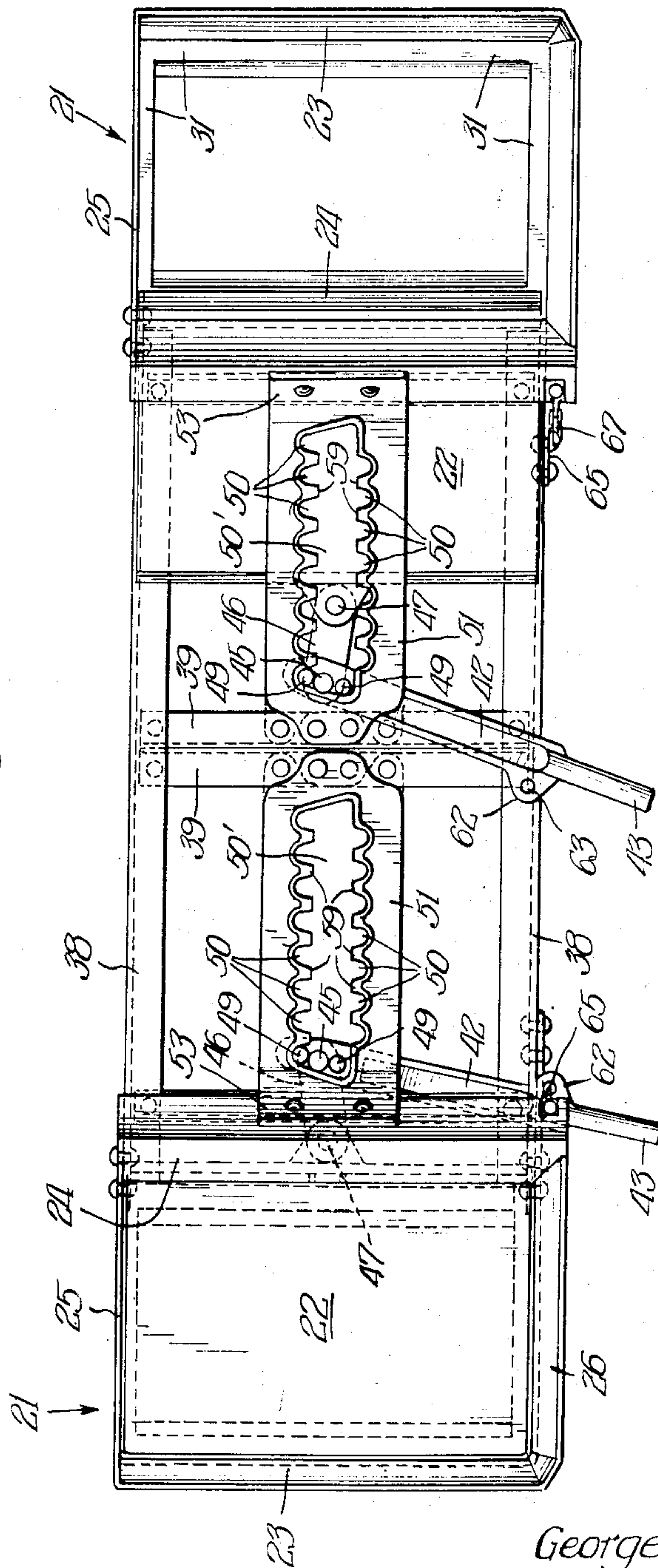
G. B. DOREY
OPERATING MECHANISM FOR SLIDING GATES
FOR HOPPERS OF HOPPER TYPE CARS

2,628,573

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4 Sheets-Sheet 1

Fig. 1



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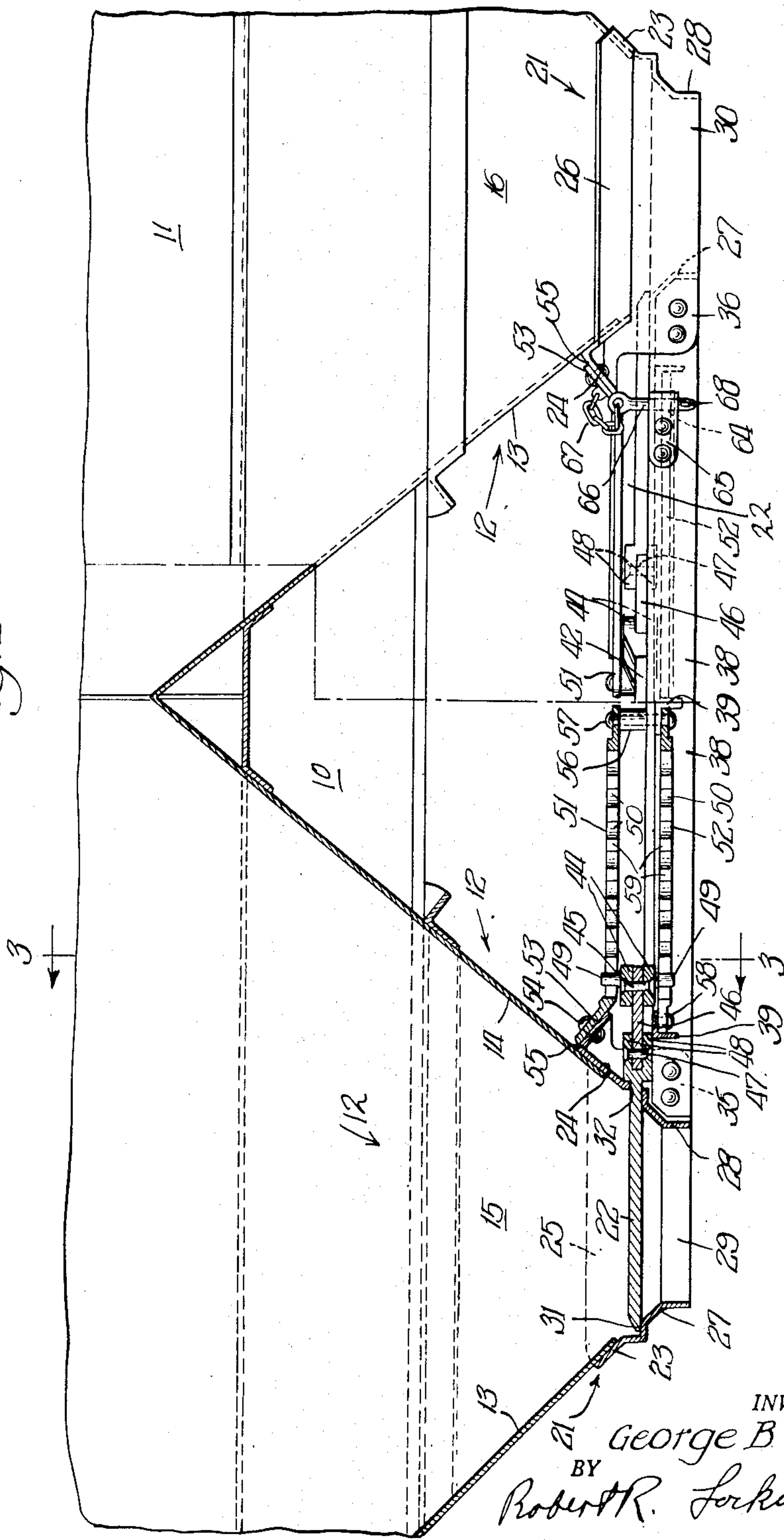
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Fig. 2.



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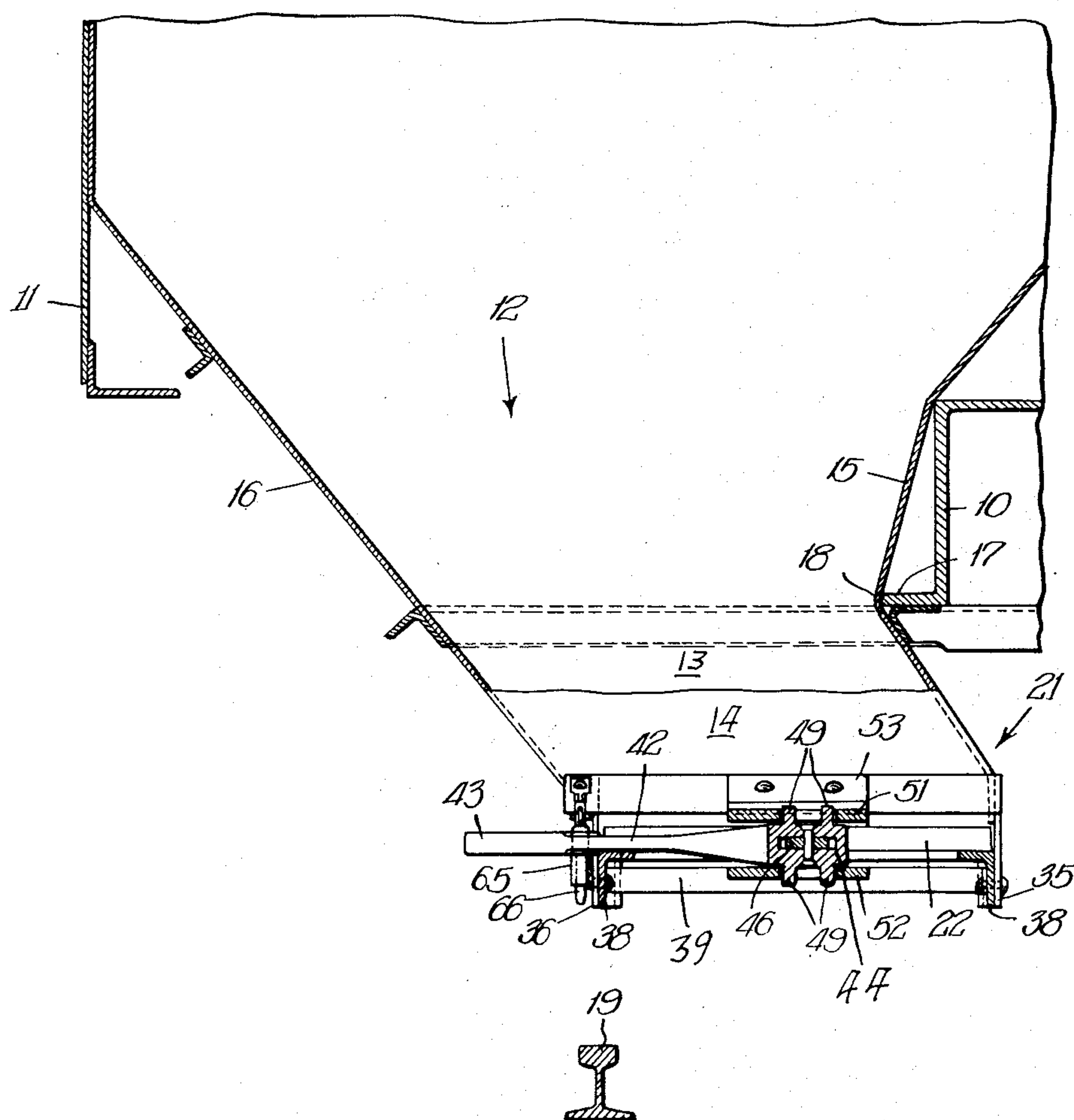
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Fig. 3.



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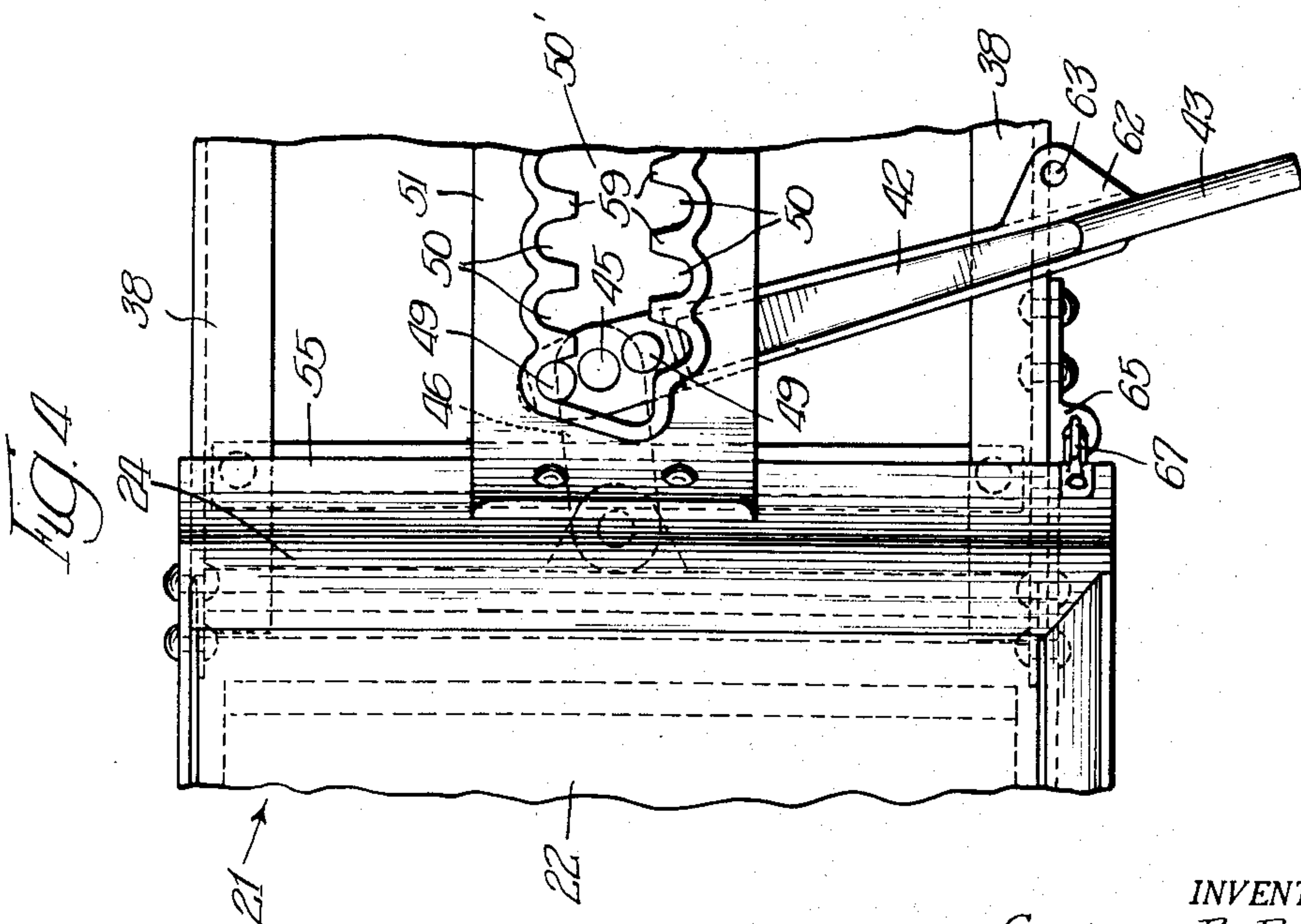
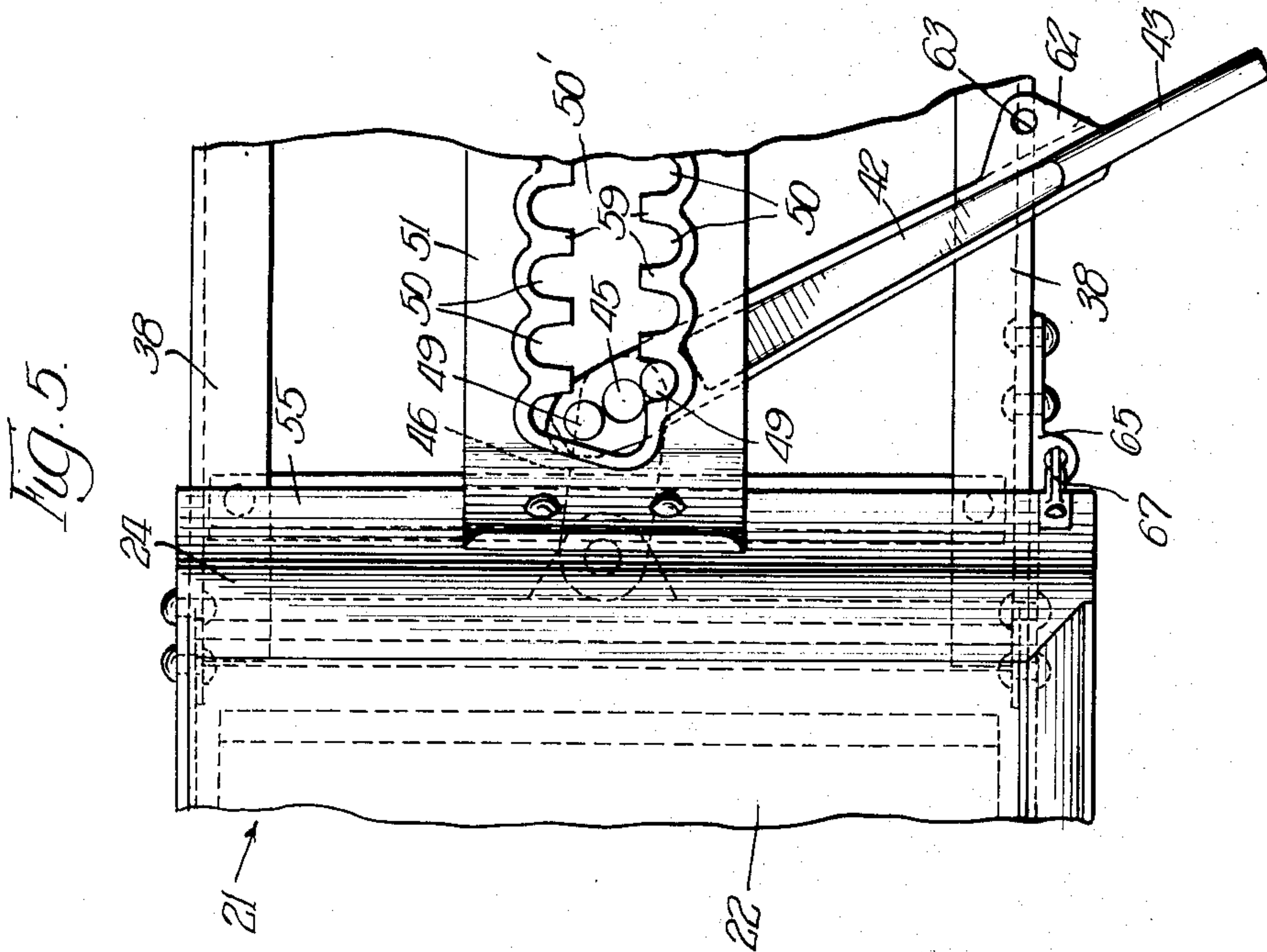
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4 Sheets-Sheet 4



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OPERATING MECHANISM FOR SLIDING
GATES FOR HOPPERS OF HOPPER
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This invention relates, generally, to discharge outlet assemblies for hoppers of hopper type railway cars, and it has particular relation to mechanism for operating the sliding gates thereof to and from the closed position.

Among the objects of this invention are: To move the gate by swinging a lever pivoted thereto in the plane thereof in successive engagement with spaced fulcrums; to mount the lever for bodily translatable movement so as to facilitate its being shifted from one fulcrum to the next; to arrange the fulcrums so that they are engaged above and below the gate; and to lock the gate closed by locking the lever against movement when the gate is closed.

Other objects of this invention will, in part, be obvious and in part appear hereinafter.

This invention is disclosed in the embodiment thereof shown in the accompanying drawings and it comprises the features of construction, combination of elements and arrangement of parts which will be exemplified in the construction hereinafter set forth and the scope of the application of which will be indicated in the appended claims.

For a more complete understanding of the nature and scope of this invention, reference can be had to the following detailed description, taken together with the accompanying drawings, in which:

Figure 1 is a top plan view of a pair of frames for positioning about the openings of a pair of hoppers, the gates for closing the openings and the mechanism for opening and closing the gates constructed in accordance with this invention;

Figure 2 is a view, partly in side elevation and partly in section, showing the application of the invention to a pair of discharge hoppers of a hopper type railway car;

Figure 3 is a detail sectional view taken generally along the line 3—3 of Figure 2; and

Figures 4 and 5 show different positions of the lever which is employed for pinching the gate of each of the discharge assemblies to and from the closed position.

Referring now particularly to Figures 2 and 3 of the drawings, it will be observed that the reference character 10 designates a center sill of a conventional type of railway car construction having a side wall that is indicated at 11. Between the center sill 10 and the side wall 11 hoppers, indicated at 12, are provided. Each hopper 12 includes transversely extending walls 13 and 14 which slope downwardly toward each other and walls 15 and 16, the walls being joined

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at the corners of the hoppers 12 to provide a tight construction. As shown in Figure 3 the inner wall 15 is indented around the lower flange 17 of the center sill 10 as indicated at 18 so that the discharge opening of the hopper 12 will be positioned inwardly of the car side wall 11 and above and between the rails, one of which is indicated at 19.

Surrounding the lower portion of each of the discharge hoppers 12 is an outlet frame that is indicated, generally, at 21. Each frame 21 carries a sliding gate 22 which is employed for closing the opening therethrough. It will be noted that each outlet frame 21 includes upper wall sections 23, 24, 25, and 26 which overlie the lower portions of the walls 13, 14, 15, and 16, respectively. They may be secured in place either by rivets or by welding as may be desired. The lower portion of each outlet frame 21 forms a discharge chute which is defined by chute walls 27, 28, 29, and 30 that depend, respectively, from the upper wall sections 23, 24, 25, and 26. The upper wall sections 23, 25 and 26 at their lower portions provide a flat wall section 31 on which the gate 22 is positioned when it closes the opening through the frame 21 as shown more clearly in Figure 2. The gate 22 is slidable to and from the closed position through a slot 32 in the upper wall section 24.

It will be noted that wall sections 35 and 36 extend from the chute walls 29 and 30. They are provided for supporting extension rails 38 on which the gates 22 slide when they are moved to the full open position. Cross members 39 extending between the extension rails 38 intermediate their ends serve to brace them and to provide a support for the gate operating mechanism which will be described now.

The operating mechanism for the gates 22 to move them into and out of the closed position includes a lever 42 associated with each gate 22. Each lever 42 is arranged to be moved in a horizontal plane and this plane includes the gate 22 which is associated therewith. At its outer end each lever 42 has a handle 43 which can be gripped by the operator to swing the lever 42 and also to move it with a translatable motion as will be apparent presently. The other end 44 of each lever 42 is bifurcated and is rockably mounted on a pintle 45, in the form of a rivet, which extends through a link 46 that is pivoted at its other end on a pintle 47, also in the form of a rivet, which extends through the arms of a bifurcated extension 48 from each sliding gate 22.

The upper and lower surfaces of the arms con-

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stituting the bifurcated end 44 of the lever 42 have upwardly and downwardly extending fulcrums in the form of trunnions 49 which are located on opposite sides of the pivot axis through the pintle 45. These fulcrums 49 are arranged to engage operatively in recesses 50, constituting pockets located in staggered or offset relation on opposite sides of a longitudinally extending slot 50', which are located in fulcrum plates 51 and 52. Each upper fulcrum plate 51 has an upwardly extending end section 53 which is secured by rivets 54 to a reinforcing wall 55 that constitutes a part of the upper wall section 24. Spacers 56, Figure 2, are located beneath the other ends of the fulcrum plates 51 for spacing them above the cross members 39. Rivets 57 extend through the fulcrum plates 51, the spacers 56 and the fulcrum plates 52 for the purpose of securing them fixedly on the cross members 39. Rivets 58 extend through the other ends of the under fulcrum plates 52 and through the cross members 39 for supporting them in operative position.

In operation it will be assumed that the gate 22, shown closed in Figure 1, is to be moved to the open position. The lever 42 is swung from the position shown in Figure 1 to the position shown in Figure 4. During this movement of the lever 42, the fulcrums 49 on opposite sides of the lever 42 and on the side of the pintle 45 away from the handle 43 operate in the recess 50 occupied thereby when the lever 42 is in a position corresponding to the closed position of the gate 22. When the lever 42 is swung to the position shown in Figure 4, the gate 22 is moved slightly toward the open position. Now the lever 42 is moved transversely in the direction of the handle 43 so that the other trunnions 49 are positioned in the recesses or pockets 50 on the opposite side of the longitudinally extending slots 50'. It will be recalled that the lever 42 is swung in a counter-clockwise direction from the position shown in Figure 1 to the position shown in Figure 4 for the purpose of effecting the initial opening movement of the gate 22. The lever 42 is shown in Figure 5 as occupying the next position to which it has been moved with a translatory movement. Now the lever 42 is swung in a clockwise direction to effect continued opening movement of the gate 22. Thus by a combination of rotary and translatory movements the fulcrums 49 are moved successively from one set of recesses 50 to the next set and they react against the wall portions 59 therebetween for opening the gate 22 in a stepwise fashion.

When the gate 22 is to be closed this sequence of operations is reversed and it is moved to the closed position in a stepwise fashion. The arrangement is such that the lever 42 always occupies the position shown to the left in Figure 1 of the drawings when the corresponding gate 22 is fully closed.

With a view to locking the gate 22 in the closed position, each of the levers 42 has a laterally extending boss or flange 62 which is provided with a vertically opening aperture 63. The aperture 63 is arranged to register with an opening 64 in a clip 65, carried by the adjacent extension rail 38, when the lever occupies a position corresponding to the closed position of the gate 22. A sealing pin 66 is arranged to extend through the aperture 63 and opening 64 when they are in registry so as to lock the lever 42 in this position and the associated gate 22 in the closed position. A chain 67 may be connected to the sealing pin 66 to prevent its being lost. At its

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lower end the pin 66 may be provided with a slot 68 for receiving a conventional seal.

Since certain changes can be made in the foregoing construction and different embodiments of the invention can be made without departing from the spirit and scope thereof, it is intended that all matter shown in the accompanying drawings and described hereinbefore shall be interpreted as illustrative and not in a limiting sense.

What is claimed as new is:

1. For combination with a load containing hopper having a discharge opening and a sliding gate for closing the same, means for moving said gate relative to said opening including fulcrums spaced from each other lengthwise of the path of movement of said gate, a link pivotally mounted at one end on said gate and extending therefrom, a lever pivotally mounted on said link at its other end, and a fulcrum on said lever near its pivot axis in position to engage successively with said spaced fulcrums for effecting lengthwise movement of said gate.

2. For combination with a load containing hopper having a discharge opening and a sliding gate for closing the same, means for moving said gate relative to said opening including a lever, means carried by one end of said gate for translatorily and pivotally supporting said lever to move longitudinally and about an axis so as to swing parallel to the path of movement of said gate, two pairs of fulcrums carried by opposite sides of said lever on opposite sides of said axis and extending from said lever parallel to said axis, and a pair of sets of fulcrums located on opposite sides of and along the general path of translatory movement of said pivot axis and arranged to be engaged alternately by said pairs of fulcrums on said lever by bodily translatory movement thereof to pinch said gate to and from its closed position by movement about said pivot axis.

3. The invention, as set forth in claim 2, wherein the fulcrums located on one side of and along the general path of translatory movement of the pivot axis are staggered with respect to the fulcrums located on the other side of and along said general path of movement.

4. The invention, as set forth in claim 2, wherein the means supporting the lever is a link pivotally mounted at one end on the gate and at its other end pivotally supporting said lever.

5. For combination in a railway car having a load containing hopper with a discharge opening, a frame for mounting on said hopper around said opening, a gate slidably mounted on said frame for closing said opening; and means for moving said gate including fulcrum plates disposed outwardly of and stationarily mounted with respect to said frame above and below said gate, each plate having an elongated aperture extending along the path of movement of said gate with a series of notches along each side, a lever, means carried by one end of said gate for translatorily and pivotally supporting said lever to move longitudinally and about an axis so as to swing parallel to the path of movement of said gate, and two pairs of trunnions carried by said lever, one pair being located on the top and the other pair on the bottom of said lever with said axis between the trunnions of each pair and parallel thereto, the trunnions on one side of said axis being arranged to engage one of said series of notches and the trunnions on the other side of said axis being arranged to engage the other of said series

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of notches to pinch said gate to and from its closed position.

6. The invention, as set forth in claim 5, wherein the notches in each plate of one series are staggered with respect to the notches of the other series.

7. The invention, as set forth in claim 5, wherein the means carried by one end of the gate for translatorily and pivotally supporting the lever is a link at one end pivotally mounted on said gate and at the other end pivotally supporting said lever for movement in the plane of said gate and the trunnions engage the respective notches in the fulcrum plates on opposite sides of said gate.

8. For combination with a load containing hopper having a discharge opening, a frame for mounting on said hopper around said opening, a gate slidably mounted on said frame for closing said opening; and means for moving said gate and locking the same closed including a lever, a fulcrum at one end of said lever, means carried by one end of said gate for translatorily and pivotally

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supporting said lever about an axis spaced from said fulcrum so as to swing parallel to the path of movement of said gate, fulcrum means on said frame for receiving said lever fulcrum on bodily translatory movement of said lever to move said gate, and means for locking said lever against pivotal and translatory movement when said gate is closed including apertures in said frame and lever adapted to be aligned and a bolt extending through said apertures.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
228,814	Hanson	June 15, 1880
380,287	Joy	Mar. 27, 1888
1,204,076	Schmoeger	Nov. 7, 1916
1,582,784	Pumphrey	Apr. 27, 1926
2,444,866	Weed	July 6, 1948