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FRONT FLOW CONSTRUCTION FOR RAILROAD SPREADERS

Filed Dec. 24, 1926

5 Sheets-Sheet 1

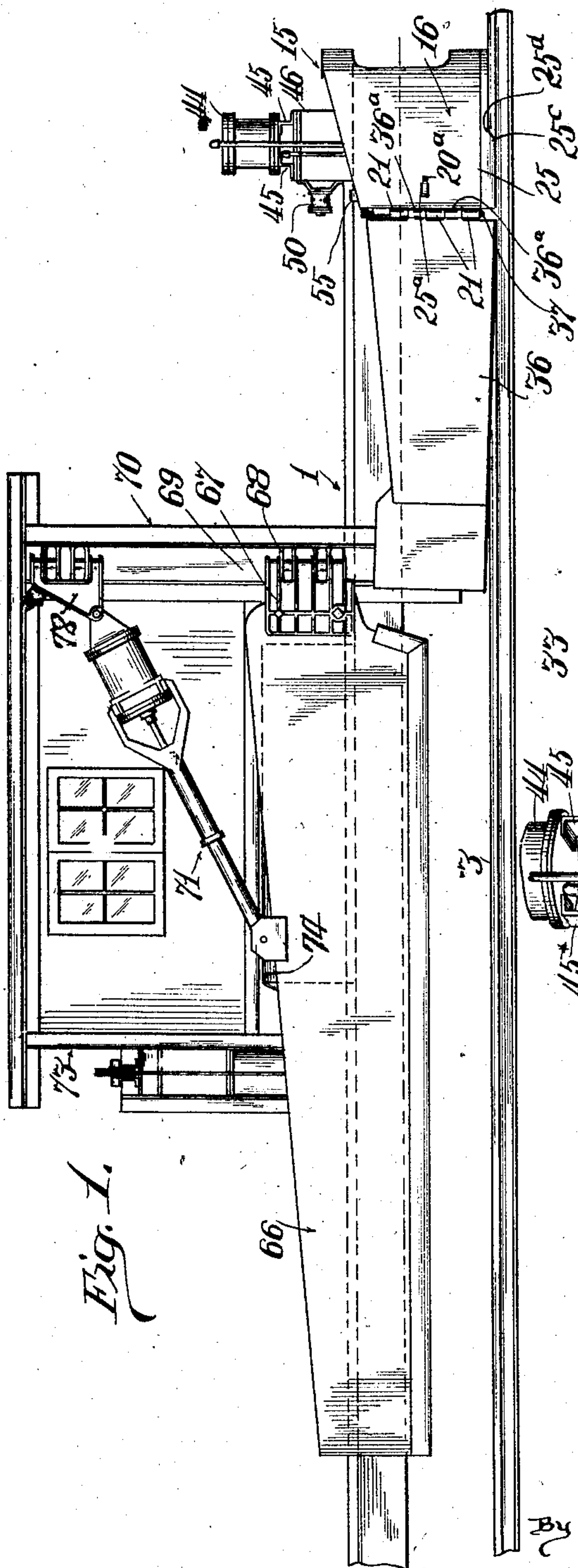


Fig. 1.

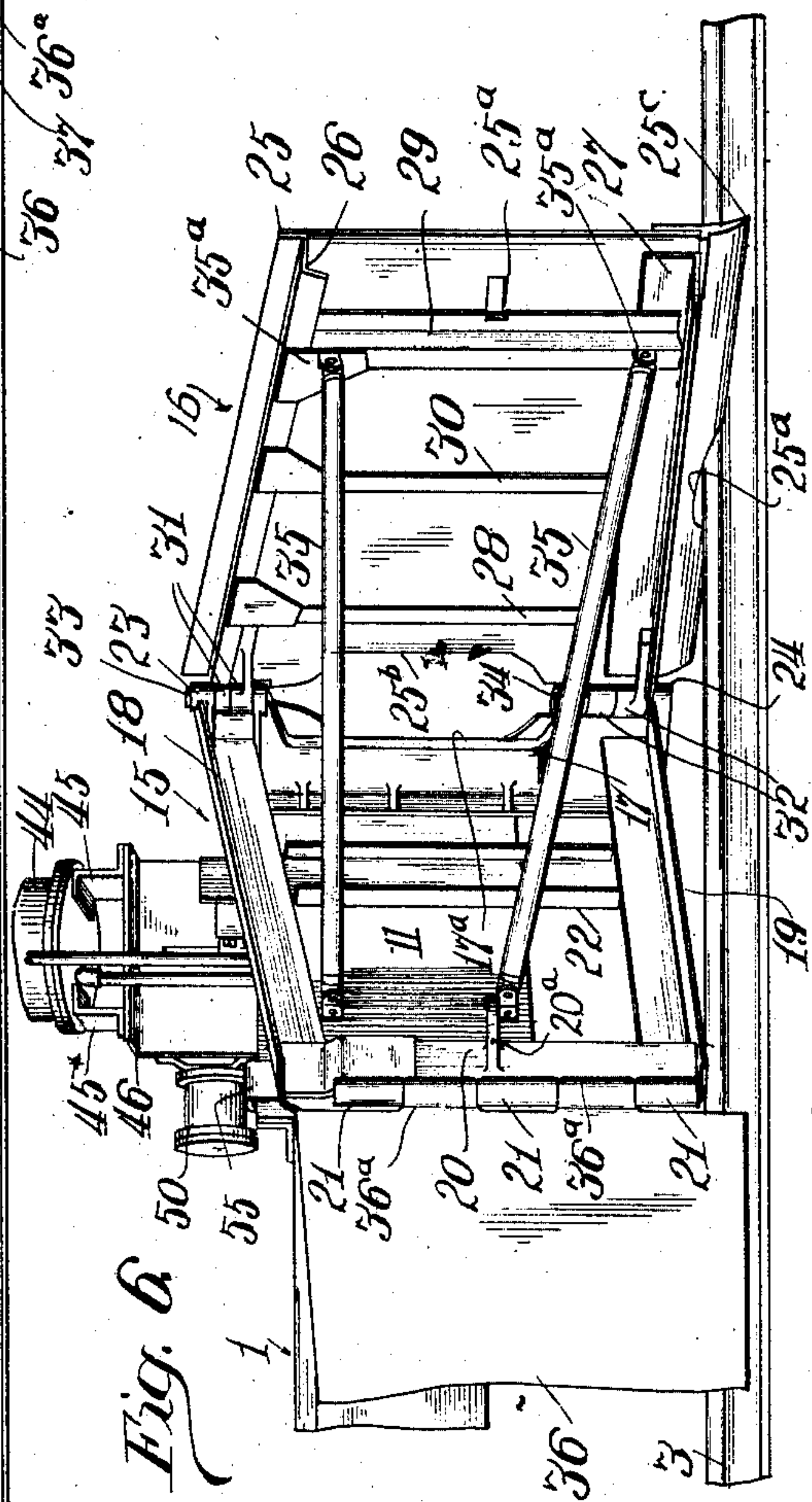


Fig. 6.

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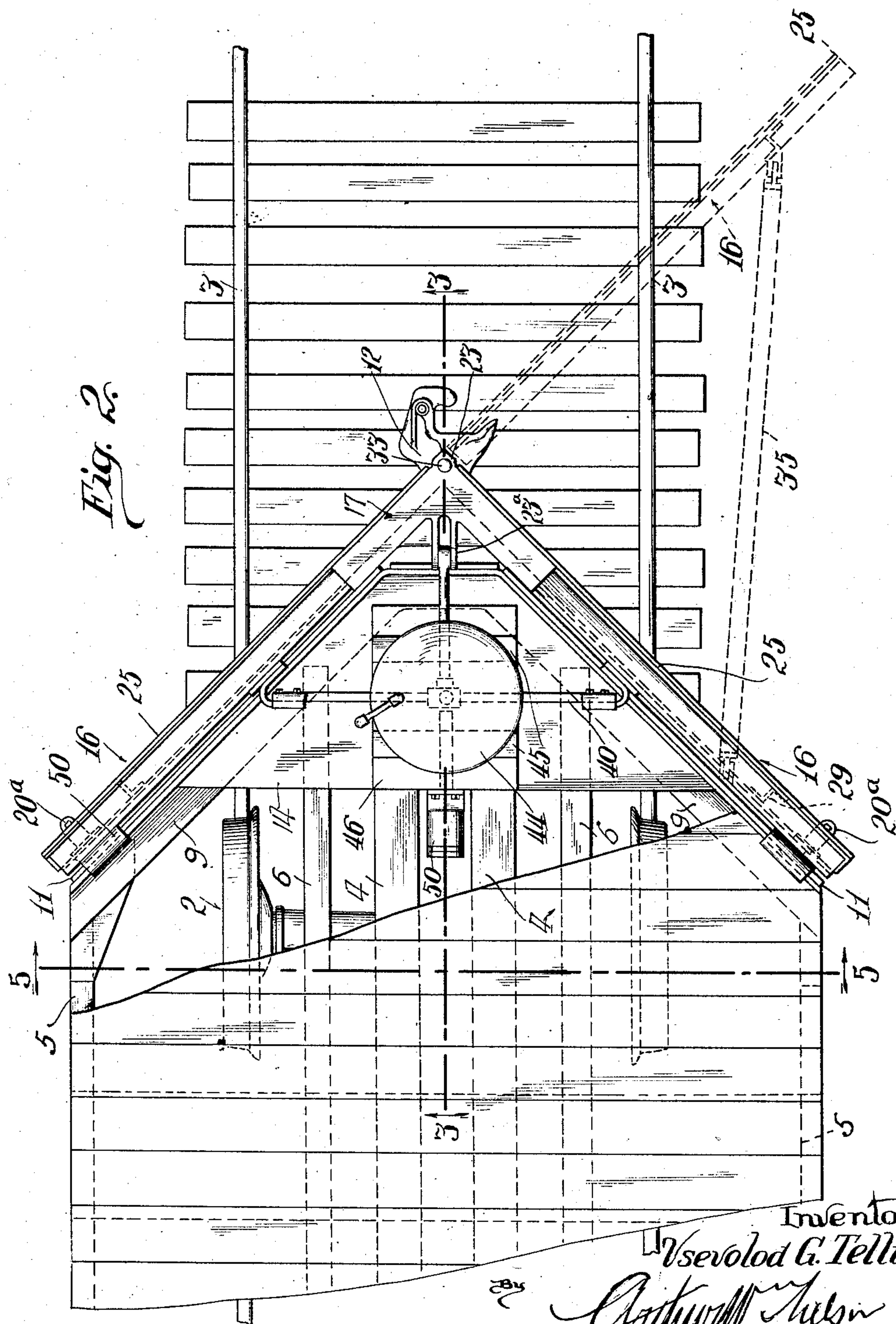
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5 Sheets-Sheet 2



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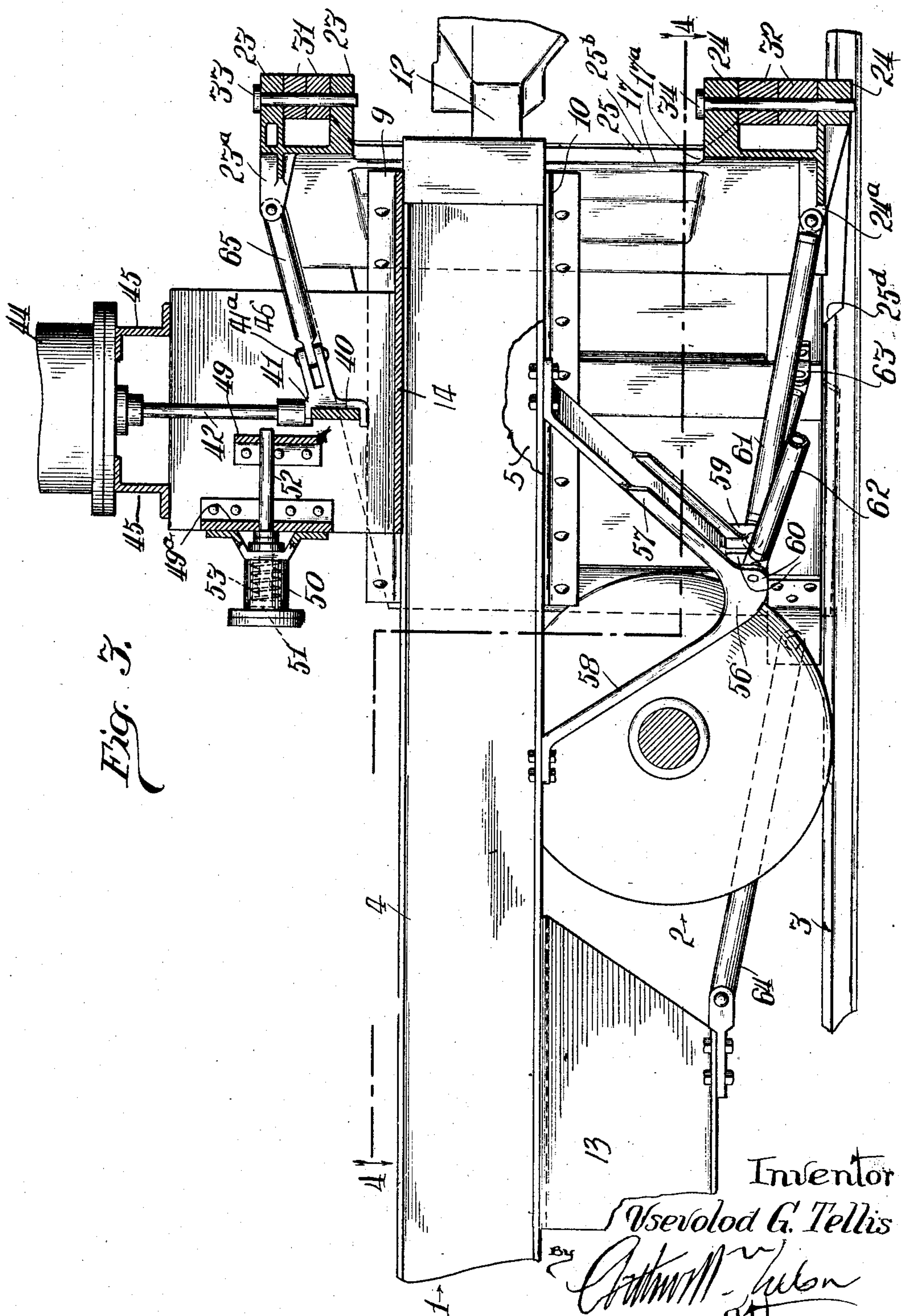
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## FRONT PLOW CONSTRUCTION FOR RAILROAD SPREADERS

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5 Sheets-Sheet 3



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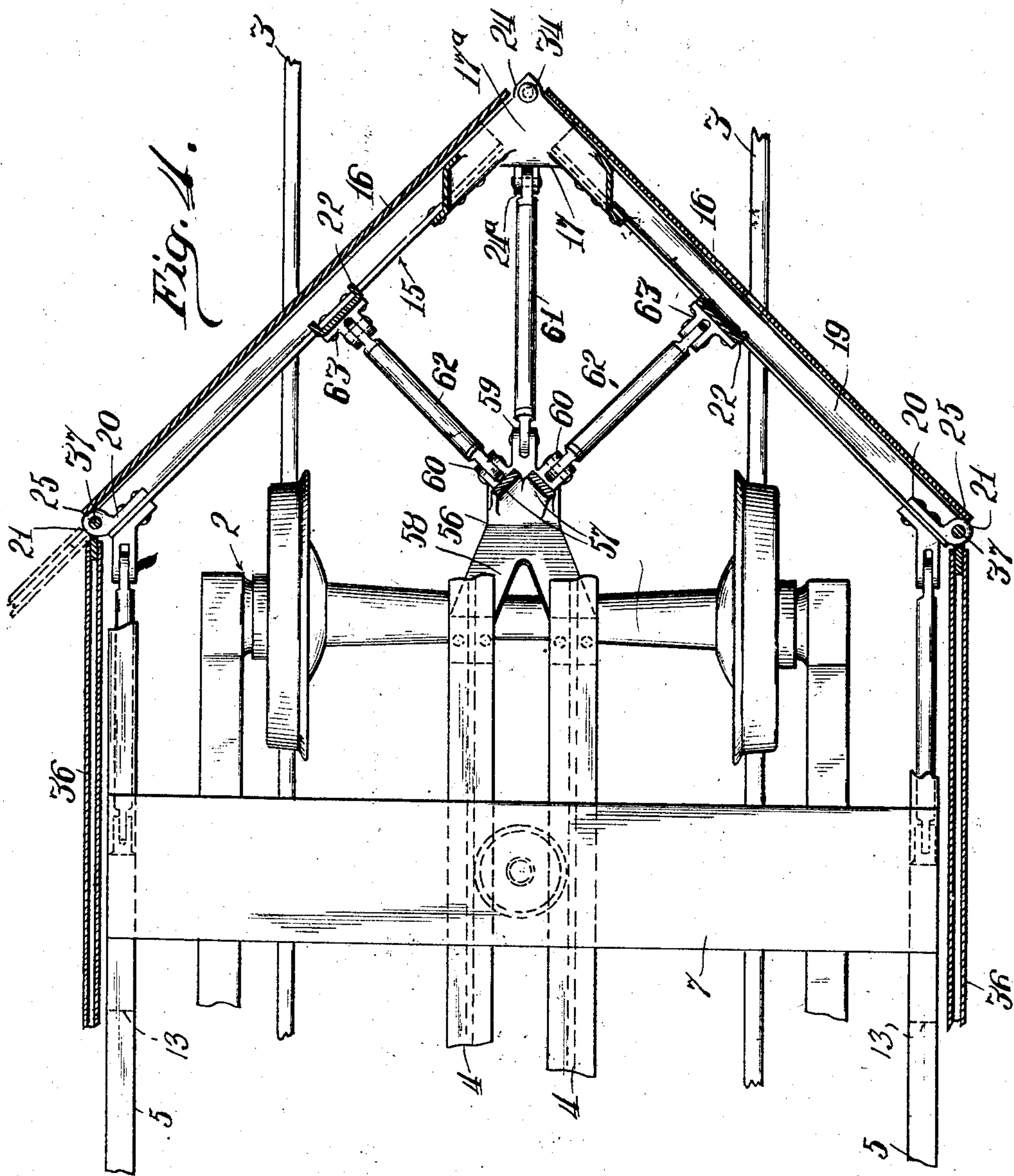
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FRONT FLOW CONSTRUCTION FOR RAILROAD SPREADERS

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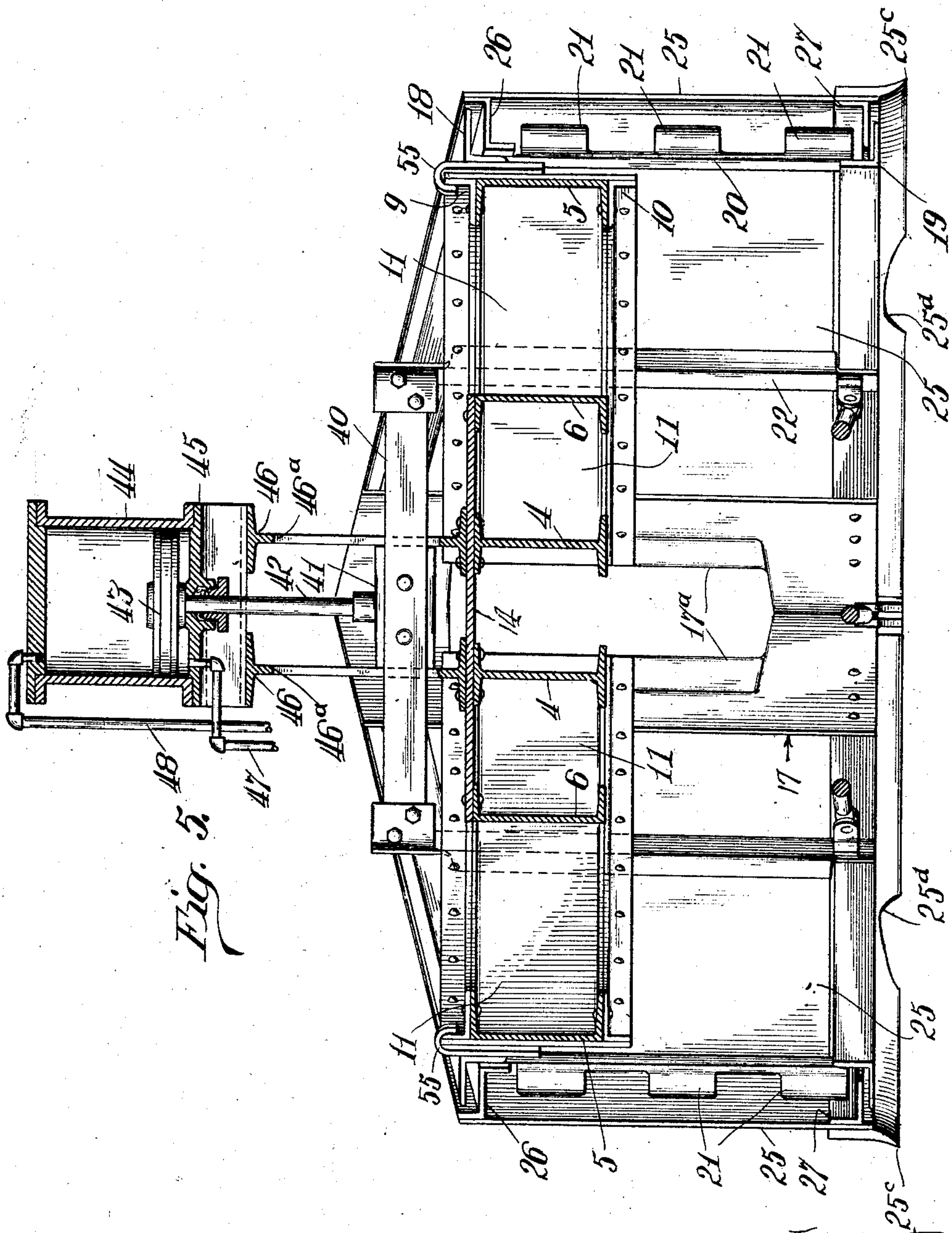


Fig. 5.

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# UNITED STATES PATENT OFFICE

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## FRONT-PLOW CONSTRUCTION FOR RAILROAD SPREADERS

Application filed December 24, 1926. Serial No. 156,792.

This invention relates to improvements in front plow constructions for railroad spreaders and it consists of the matters hereinafter described and more particularly pointed out in the appended claims.

Railroad spreaders as heretofore constructed included a front plow which was relatively low in that it was arranged in a plane below the deck and underframing of the car with the result that its vertical adjustable movement was indeed limited. When such a spreader was employed in snow plow work in relatively deep snow, a portion of the snow piled over the top of the plow, onto the deck and other portions flowed under the deck upon the track to the rear of the plow so that the spreader could not work effectively in such deep snow.

The primary object of the invention is to provide a high front plow for the spreader the top edge of which extends substantially flush or even with the front platform or deck so that the plow may operate in deeper snow or other material without permitting the material to pile upon the deck or flow over the top of the plow and back upon the track.

A further object of the invention is to provide an improved mounting for the plow relative to the car whereby the plow may be more readily raised and lowered and is more rigidly braced to withstand the great strains to which it is subjected in use.

These objects of the invention as well as others together with the many advantages thereof will more fully appear as I proceed with my specification.

In the drawings:

Fig. 1 is a view in side elevation of a railroad spreader embodying my improved front plow construction.

Fig. 2 is a top plan view on an enlarged scale of my improved front plow construction with parts broken away to more clearly illustrate the same.

Fig. 3 is a longitudinal vertical section as taken on the line 3—3 of Fig. 2.

Fig. 4 is a horizontal sectional view as taken on the line 4—4 of Fig. 3.

Fig. 5 is a transverse vertical sectional view as taken on the line 5—5 of Fig. 2.

Fig. 6 is a view in side elevation of my improved front plow construction with one of the plow members swung into parallelism with the other plow member as when moving material from one side of the track to the other.

Referring now in detail to that embodiment of my invention illustrated in the accompanying drawings, 1 indicates as a whole the car of a railroad spreader mounted on front and rear wheeled trucks 2 (only the front truck being shown herein) adapted for travel upon the rails 3 of a railroad track. Said car includes center sills 4—4, side sills 5—5 and intermediate sills 6—6 all of said sills being arranged in the same horizontal plane and connected together near their front ends by a cross sill 7 arranged in the transverse plane of the bolster of the truck 2.

The center sills which are in the form of I beams project a considerable distance beyond the front ends of the side sills which are in the form of channels while the intermediate sills which are also in the form of channels are shorter than the center sills and longer than the side sills. The extreme ends of the sills on both sides of the car are rigidly secured together by pairs of top and bottom angle bars 9 and 10 respectively with their horizontal flanges fixed to said sills and facing inwardly and with their vertical flanges facing in opposite directions as best shown in Fig. 5. A plate 11 is fixed to the vertical flanges of each pair of angle bars and the inner ends of the plates are spaced apart for the free passage of the draw bar 12 which is connected by suitable draft rigging (not shown) to the front ends of the center sills. The construction of the framing just described imparts a pointed or V-shaped end to the car as a whole. Depending from each side sill, a short distance from its front end is a short section of structural member 13, and on the top flanges of the front ends of the side and intermediate sills is a plate 14, the purpose of said member 13 and plate 14 appearing later.

15 indicates as a whole (see Fig. 6) the skeleton like front plow frame and 16—16 indicate the front plow members which are



pivoted to said frame so as to be swung away from and toward said frame but are vertically movable therewith. The frame 15 is substantially V-shaped as it conforms in plan to the pointed or V-shaped end of the car underframing. Said frame includes an upright nose casting or yoke 17 with a vertically disposed opening 17<sup>a</sup> therein for the passage of the draw bar. Diverging from each side of said casting are pairs of top and bottom angle bars 18 and 19 respectively, the top angle bars of each pair being inclined downwardly toward their outer ends and the bottom angle bars being horizontally disposed. The outer ends of each pair of angle bars are connected together by an upright end member 20 which includes vertically spaced bearing ears 21—21. Between the casting 17 and end member 20, the angle bars of each pair are connected together by an upright channel 22. The frame thus described is closely engaged against the plates 11 at the forward end of the various sills of the under frame. Said upright end member 20 is provided between its ends with a forwardly extending apertured ear 20<sup>a</sup>, the purpose of which will appear later. The nose casting 17 is provided at the top and bottom of the opening 17<sup>a</sup> therein with forwardly extending top and bottom pairs of vertically spaced, aligned bearing ears 23 and 24 respectively and with rearwardly extending arms 23<sup>a</sup> and 24<sup>a</sup> respectively.

Each front plow member includes a plow plate 25 conforming in size and shape to the associated side or half of the plow frame 15. On the rear side of said plates are top and bottom structural members 26 and 27 respectively the former being a Z bar and the latter an angle bar. Also on the rear side of each plate are laterally spaced upright inner outer and intermediate Z bars 28 and 29 and 30 respectively which are secured to the top and bottom structural members by suitable gusset plates. All of said bars on the rear side of the plow plate are riveted thereto and act to strongly and rigidly support said plate so that it cannot twist or warp out of shape. Each plow plate is provided at its inner end with top and bottom bearing ears 31—32 securely fixed to the structural member 26 and 27 respectively and said ears are adapted to interfit with the associated bearing sleeves 23—24 of the nose casting 17. Suitable hinge pins 33—34 are inserted through the various ears whereby the front wing members may be swung about said pins away from and toward the associated sides of the plow frame. In the outer end of each wing plate 25 is provided an opening 25<sup>a</sup> through which the ear 20<sup>a</sup> on an associated upright end member 20 extends when said plow member is in engagement with its associated part of the plow frame after which a removable pin is driven through the aperture of said ears 20<sup>a</sup> to se-

cure said plow member in this position. In some instances it is desired to move material from one side to the other of the track. To do this one plow member is swung away from the plow frame into parallelism with the other plow member as shown in dotted lines in Fig. 2 and removable brace bars 35 are then interposed between the rear of said plow member and the front of the associated framing plate 11, as best shown in Fig. 6. To accommodate said brace bars brackets 35<sup>a</sup> are provided on the rear side of said plow plate and on said framing plate 11 respectively to which the ends of said brace bars are detachably connected. In the inner ends of the front plates of said plow members are cut away portions 25<sup>b</sup> which line up with the opening 17<sup>a</sup> in the nose casting for the passage of the draw bar.

Associated with each front plow member is a wing or apron 36 which has spaced bearing sleeves 36<sup>a</sup> at its front end to interfit the similar sleeves on the members 20 at each outer end of the plow frame, a pin 37 extending through all of said ears to hingedly connect the wing or apron to the plow frame. Thus when said wings extend parallel with the car they prevent the material being spread from flowing under the rear end of the plow members to ridge upon along the ends of the ties in the track. By this connection, the wings or aprons are vertically movable with the plow frame. Said wings or aprons may be used for light spreading work and in some instances may be swung outwardly from the car into parallelism with its associated wing as shown in dotted lines in Fig. 4 to form an extension of said plow member, being held in this position by removable struts (not shown) similar to those associated with the front plow members as before described. Each plow member is provided along its bottom edge at the front thereof with a cutter blade 25<sup>c</sup> part of which is cut away as at 25<sup>d</sup> in Fig. 3 to clear the rails when the plow is in its lowermost vertical operative position.

As before stated the front plow frame and plow members together with their aprons and wings are vertically movable and such means are as follows:

40 indicates a transversely extending edge-wise disposed bar, located above the various center, side and intermediate sills and fixed at its ends to the top ends of the upright intermediate channel braces 22 of the plow frame at best shown in Figs. 2 and 5. Intermediate its ends, said bar is attached to a cross head 41 fixed to the bottom end of an upright piston rod 42. The top end of said rod carries a piston 43 operable in an upright cylinder 44 arranged in the median line of the car a short distance to the rear of the plane of the nose casting. Said cylinder is mounted at its bottom end on a pair of short



transverse Z bars 45—45 which rest on a pair of short, longitudinal I beams 46—46 one positioned directly above each center sill and resting on the plate 14 before mentioned. This construction provides a pedestal for the cylinder 44. Each I beam 46 has a vertically elongated slot 46<sup>a</sup> through which the cross bar 40 is capable of movement and the ends of the cross head 41 engage with the webs of said beams and thus prevent a lateral movement of the cross bar. Fluid under pressure may be admitted to the cylinder 44 either through its bottom by a pipe 47 leading from a suitable supply or through its top by a pipe 48 opening through the top or head of the cylinder. When such fluid is admitted through the pipe 47, the pipe 48 acts as the exhaust. Thus when the fluid under pressure is admitted to the bottom end of said cylinder, the front plow frame, plow members and wings or aprons are moved upwardly and when fluid is cut off from pipe 47 and is admitted to the top of the cylinder through the pipe 48 then the front plow frame, plow member and wings are moved downwardly. To take the strain off the cylinder 44 when the plow frame and associated parts are in their uppermost position and to lock it while working and in transit I provide the following mechanism. On the rear ends of the short I beams 46 forming a part of the supporting pedestal for the cylinder 44 are two longitudinally spaced, front and rear cross plates 49 and 49<sup>a</sup> respectively. To the rear cross plate 49<sup>a</sup> is fixed a rearwardly extending small power cylinder 50 to the piston 51 of which is fixed a forwardly extending piston rod 52 that has sliding bearing in suitable openings in said cross plates. When fluid under pressure is admitted through the head end of said cylinder the piston and piston rod are moved forwardly so that the free end of the piston rod extends across the plane of the cross bar 40. Thus when the front plow parts are in the uppermost position the free end of the piston rod 52 extends under the cross bar and supports the plow frame. By reason of the relatively short distance said rod extends beyond the front cross plate 49 to engage beneath the cross bar 40 it ably supports the same without any appreciable bending strain. In the cylinder forwardly of the piston and surrounding the rod therein is a helical expansion spring 53 which is compressed in the forward movement of the piston to bring the rod into position to be engaged by the cross bar 40. When it is desired to retract said rod out of supporting engagement with the cross bar, fluid under pressure is cut off from said cylinder and the spring expands to move the piston and piston rod rearwardly.

Fixed to the rear end of each downwardly and outwardly extending inclined top angle bar of the plow frame is an upwardly ex-

tending bent over member 55 adapted when the plow frame and associated parts are in their lowermost position to have a hooked engagement with the upright flanges of angle bars 9 and top marginal edges of the plates 11 near their rear ends as best shown in Fig. 5. Thus the major portion of the weight of the plow frame and associated parts is removed from the piston 43 and cylinder 44 and is imposed directly upon the under frame of the car. It is pointed out that when the plow members are in their normal positions engaged against their associated sides or halves of the plow frame the top and bottom bars 26 and 27 of each plow member engage below and above the like bars on said plow frame as best shown in Fig. 5 so that they "fold" so to speak, snugly against said frame and thus occupy but a minimum amount of space.

When the plow enters a mass of material previously dumped between the rails or when operating in heavy snow, it is apparent that the strains imparted to the front plow and its frame is indeed considerable and if the frame were not properly braced from the car, the tendency would be to tip the frame forwardly about its top end and thus cause it to warp so as to bind against its intended vertical movement. Hence I have provided the following construction. 56 indicates a substantially V-shaped duplex member, having front and rear pairs of arms 57 and 58 respectively, which diverge upwardly in opposite directions from the apex of said member which apex includes radially extending pairs of center and side ears 59 and 60 respectively. The rear arms 58—58 also diverge slightly laterally and the top ends thereof are secured, to the bottom flanges of the center sills. The front arms diverge laterally at a greater angle and their top ends are secured to the bottom flanges of the intermediate sills as best shown in Fig. 3. A tubular strut or brace 61 is pivoted at its rear end between the ears 59 while its forward end is likewise pivoted to the rearwardly extending ear 24 at the bottom of the nose casting 17. Similar struts or braces 62—62 are operatively connected at their rear or inner ends, to said ears 60 and at their front or outer ends to brackets 63—63 on the plow frame at the bottom end of the channels 22 thereon, said last mentioned braces extending at a right angle to the associated halves of said plow frame as best shown in Fig. 4. The rear ends of the plow frame are connected in a similar manner by braces or struts 64—64 with the short beam sections 13 depending from the side sills.

The top rearwardly extending ear 23<sup>a</sup> of the nose casting is connected by a link 65 to forwardly extending ears 41<sup>a</sup> on the yoke 41 before mentioned. The connection for said ends of said links are pivotal connections and the axis of one is arranged at a right angle



to the other so that the link may be capable of not only a vertical movement but also a slight lateral movement.

It is apparent that the resistance of the material acted upon is imposed more directly upon the bottom margins of the plow members and this resistance is imparted to the plow frame but is resisted by the braces which as before described are supported from the car underframe. Thus the forward tipping of the plow frame is guarded against, the top end of the plow frame being further held by the link 65 as described. The braces and link described while efficient to resist the strain imposed upon the plow frame are sufficiently flexible to permit the ready raising and lowering movement of the plow frame and associated parts.

On each side of the car to the rear of each plow wing or apron, there is provided a main spreader wing 66, the inner front end of which is pivoted as at 67 to a hinge plate 68 in turn having a pivotal connection with the bottom end of a wing block carriage 69 slidable in a vertical post 70 on the associated side of the car. 71 indicates the telescopic wing lifting brace operatively connected to said main spreader wing at one side and in a similar manner connected to a hinge block 72 at the top end of the carriage 69. Said wing normally occupies a position parallel with the car body but may be swung into an angular position with respect thereto in any suitable manner. Above the deck of the car and extending rearwardly from said wing posts is a cab 73 for the operator and beneath said cab is a tank 74 (see Fig. 1) for the supply of fluid under pressure for the various operating cylinders.

By my improved construction I am enabled to provide a relatively high front plow construction on a railroad spreader which was not heretofore attainable. Thus the spreader may operate more efficiently in greater masses of material to be spread and in deeper snows when doing snow plow work. Again I am enabled to better distribute the service strains and to more directly impose them upon the car underframe than has heretofore been possible. The parts are more conveniently located for ready access in making inspections and repairs and in all a more efficient and simple construction is obtained.

While in describing my invention, I have referred to many details of construction as well as form and arrangement of the parts thereof the same is to be considered as by way of illustration only so that I do not wish to be limited thereto except as may be pointed out in the appended claims.

I claim as my invention:—

1. In combination with a car having a V shaped front end, a similarly shaped plow frame mounted on said front end for a ver-

tical raising and lowering movement, said plow frame approximating the height of said front end, a plow supported on said plow frame and including plow plates hinged to said frame at the top and bottom thereof, means for raising and lowering said plow frame, and hooks on said plow frame engaging fixed parts of the car when said plow frame is in substantially its lowermost position.

2. In combination with a car having a V shaped front end a similarly shaped plow frame mounted on said front end and including a nose casting, with top and bottom bearing sleeves, upright rear members and top and bottom bars, plow plates having bearing sleeves interfitting with and pivotally connected to said sleeves on the nose casting, coacting means on said nose casting and plow plates for releasably locking said plates against the plow frame, and means on the car for raising and lowering said frame.

3. In combination with a car having a V shaped front end, a similarly shaped plow frame mounted on said front end and including a nose casting, with top and bottom bearing sleeves, upright rear members and top and bottom bars, plow plates having bearing sleeves interfitting with and pivotally connected to said sleeves on the nose casting, said nose casting and plow plates having vertically elongated openings for the passage of the drawbar of the car, and coacting means on said nose casting and plow plates for releasably locking said plates against the car frame and means for raising and lowering said frame.

4. A front plow frame for a railroad spreader embodying therein an upright nose casting having diverging side portions and forwardly extending top and bottom pairs of spaced bearing sleeves with an elongated opening between said pairs of spaced ears, upright end members, and top and bottom members connecting the like ends of the nose casting with the like ends of said upright end members, at the diverging sides thereof, and bracing members between the nose casting and end members and connecting said top and bottom members together.

In testimony whereof, I have hereunto set my hand, this 11th day of December, 1926.

VSEVOLOD G. TELLIS.