

No. 654,836.

Patented July 31, 1900.

F. MERTSHEIMER & J. A. EDSON.

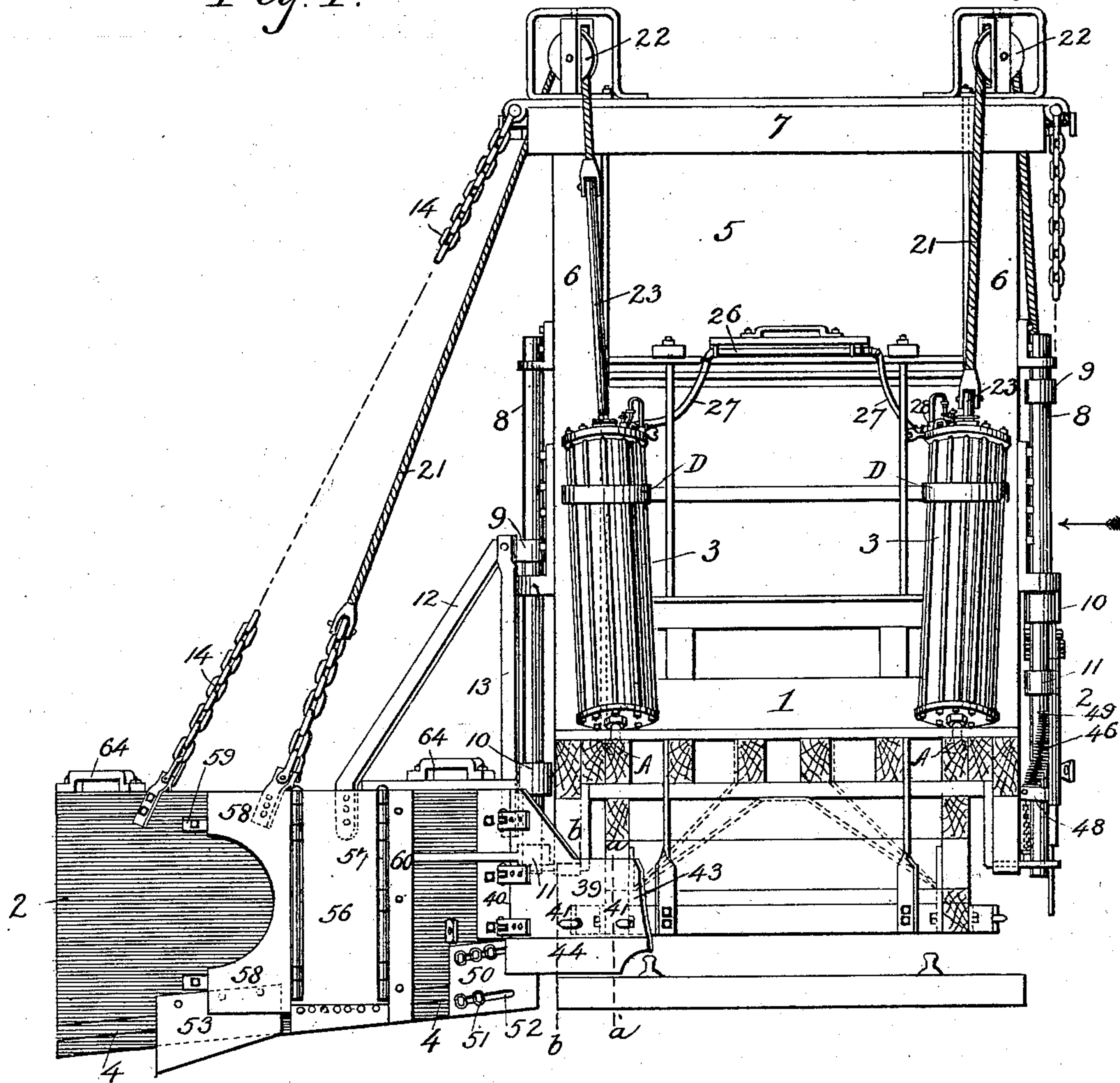
GRADING MACHINE.

(Application filed Apr. 16, 1900.)

(No Model.)

5 Sheets—Sheet 1.

Fig. 1.



Witnesses
P. J. Elmore
A. W. E. Kennedy

Inventors
Frederick Mertsheimer
Job A. Edson
Phil T. Dodge Attorney

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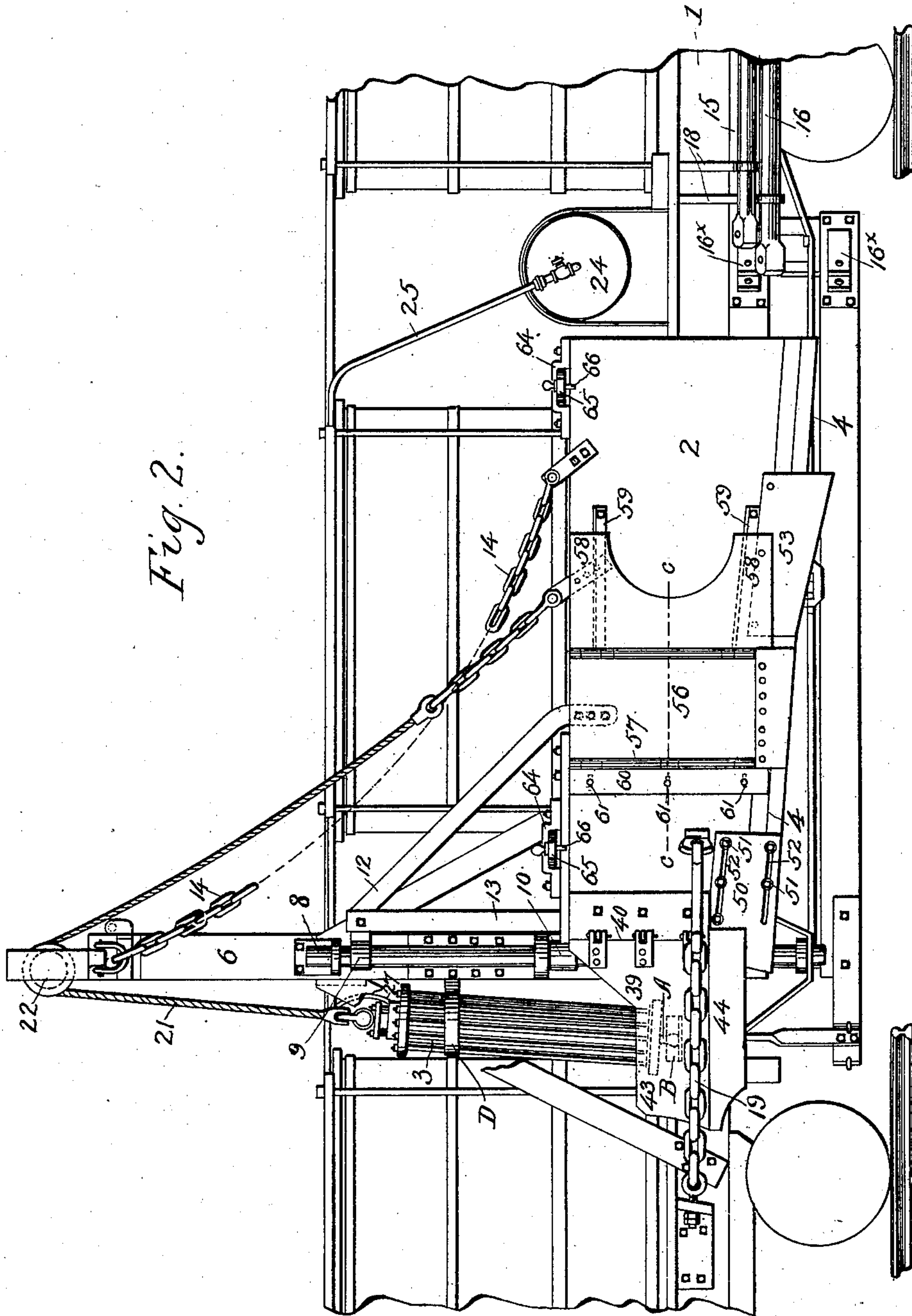
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Witnesses
P. J. Elmore
A. W. E. Kennedy

Inventors
Frederick Mertsheimer
Job A. Edson
By Phil. T. Dudgeon atty

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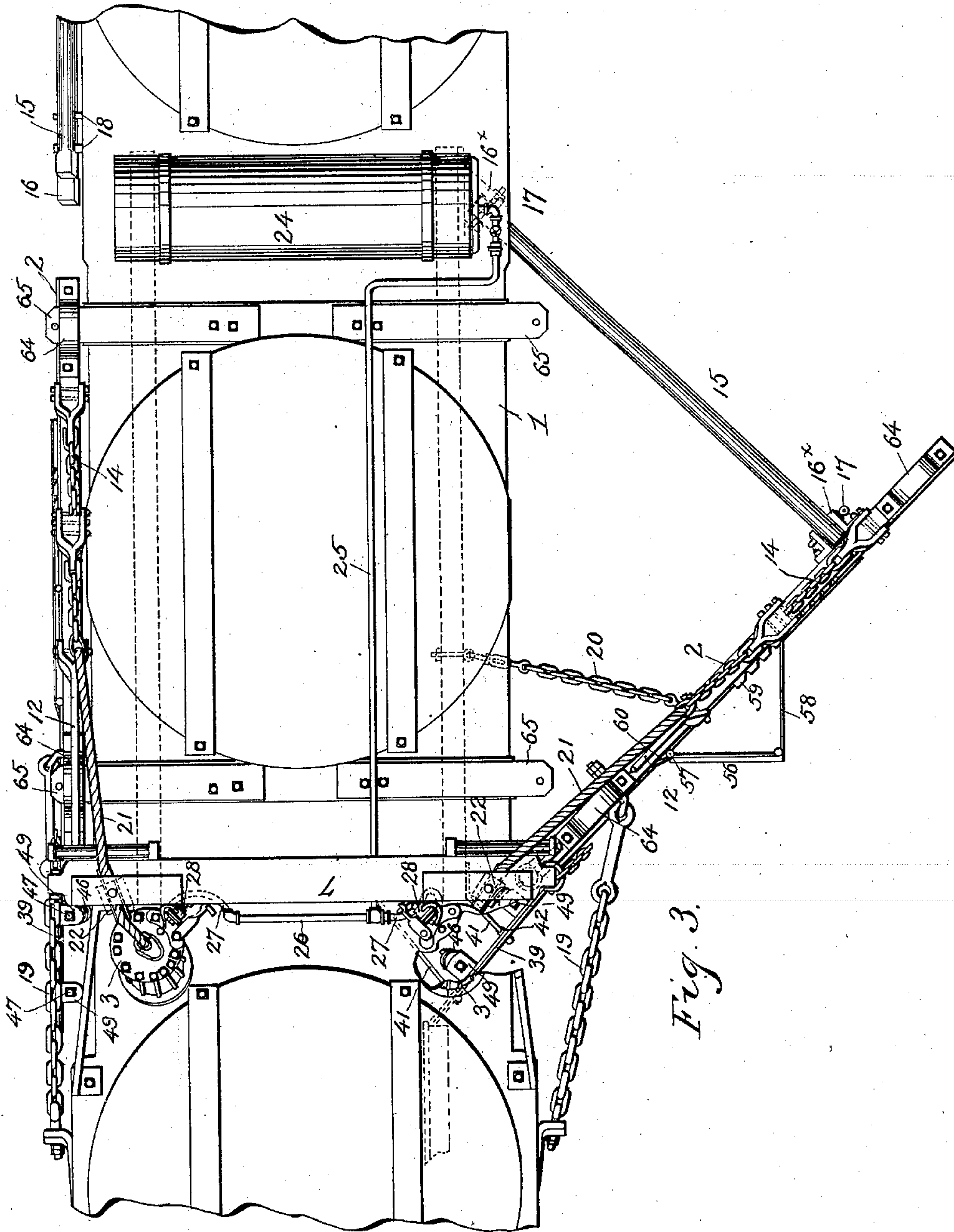


Fig. 3.

Witnesses
P. J. Elmore
A. W. Kennedy

Inventors
Frederick Mertsheimer
Job. A. Edson
B. P. Dodge Attorney

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Fig. 5

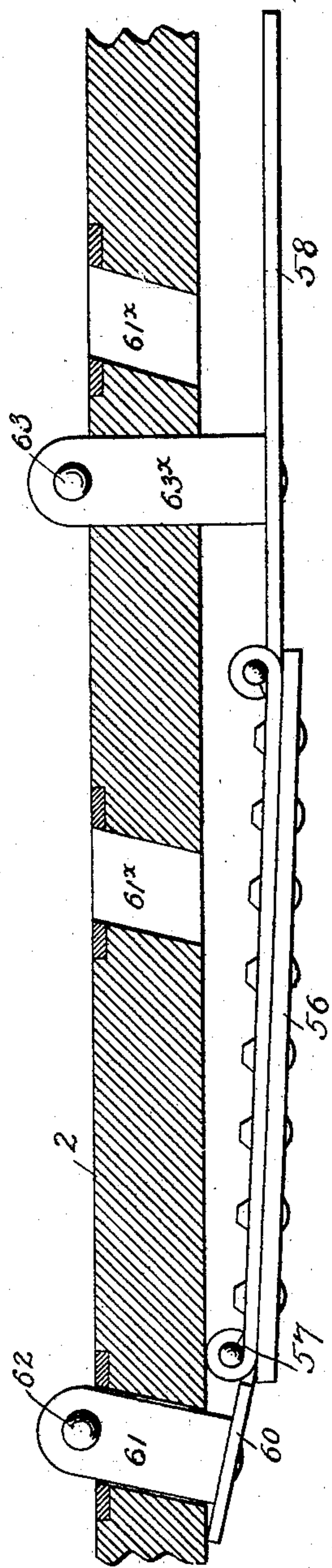
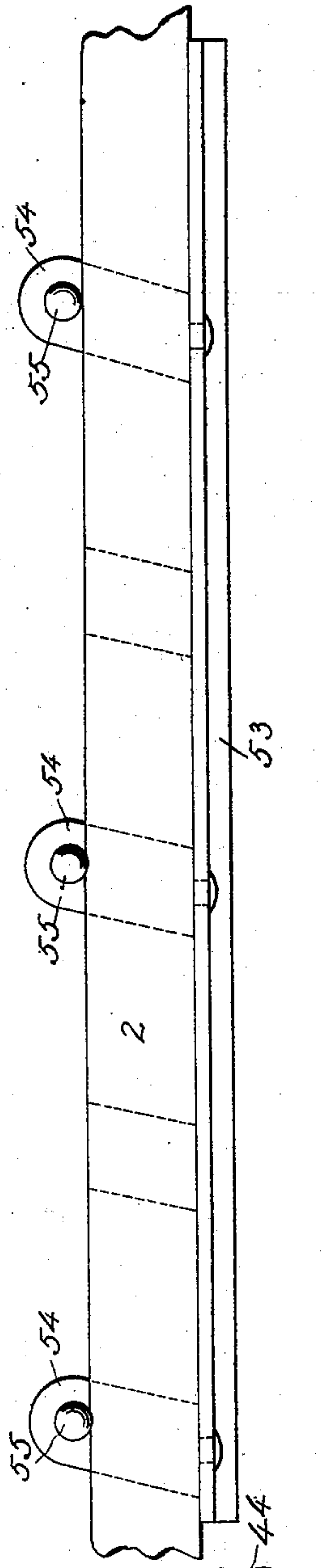
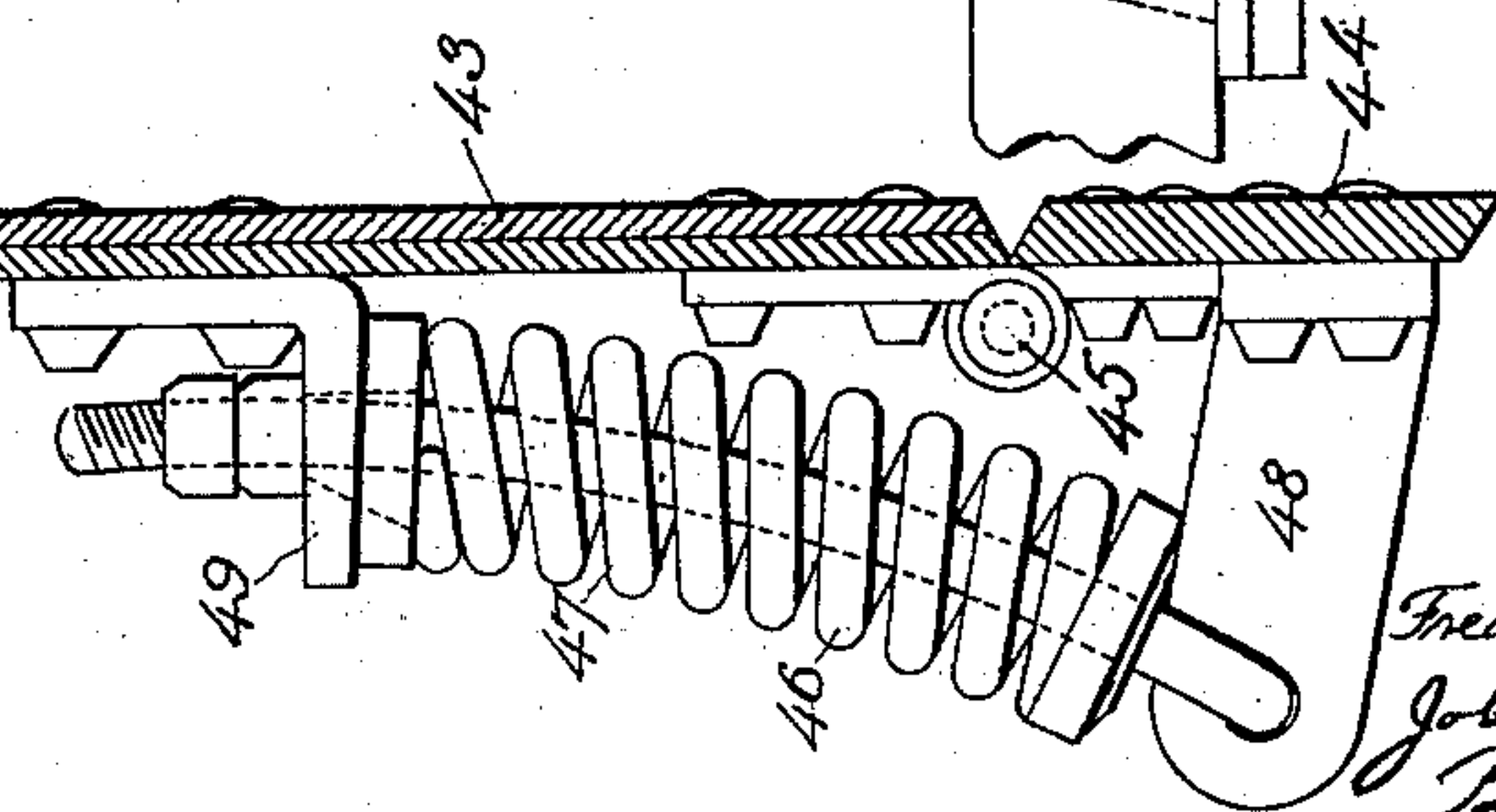


Fig. 6.



Witnesses
P. J. Elmore
A. M. E. Kennedy.

Fig. 4.



Inventors
Frederick Mertsheimer
J. A. Edson
P. T. Dodge
Attorney

No. 654,836.

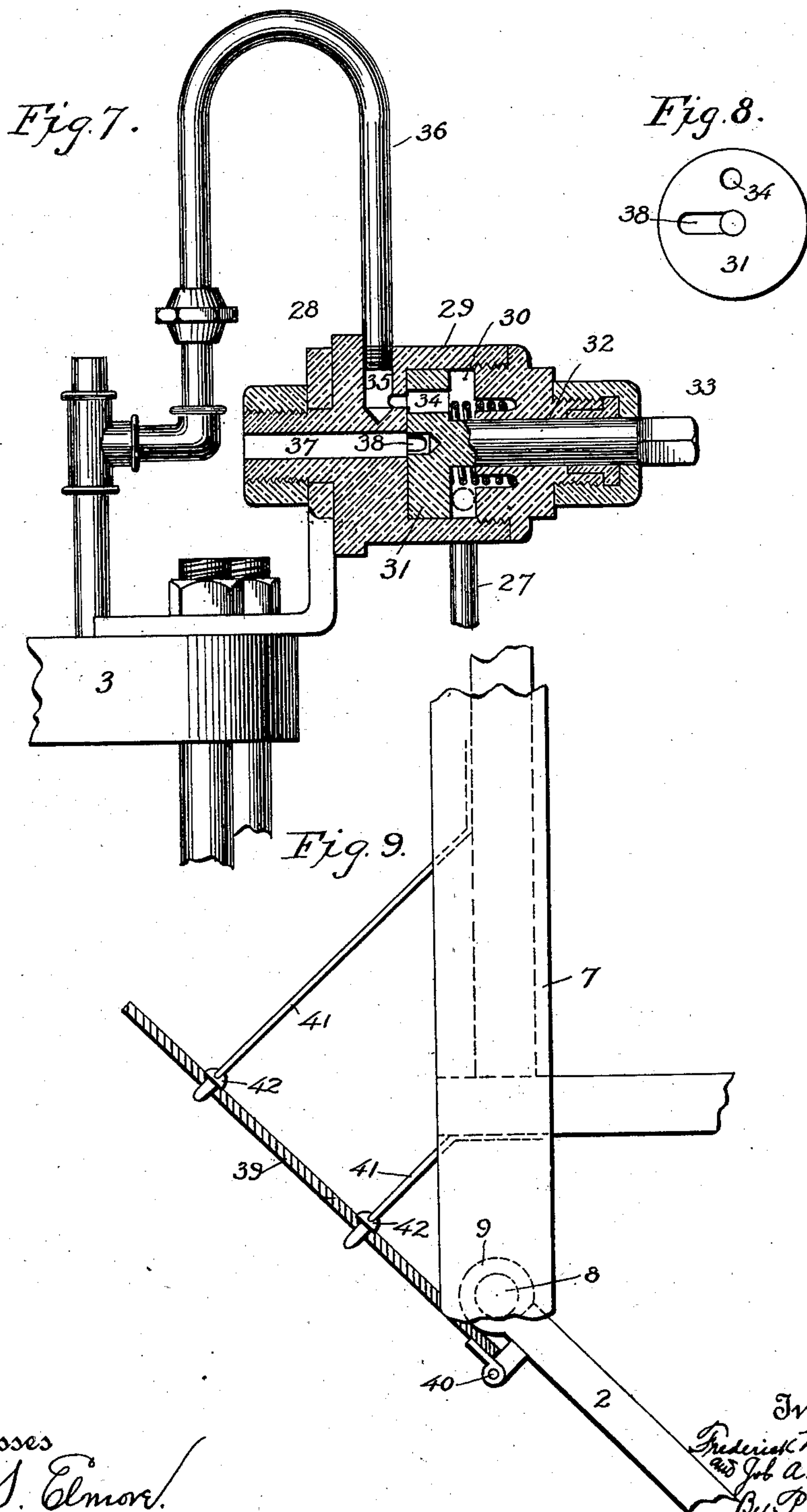
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5 Sheets—Sheet 5.



Witnesses
D. J. Elmore
A. R. Kenna

Inventors
Frederick Mertsheimer
and J. A. Edson
By P. T. Noddy
Attorney

UNITED STATES PATENT OFFICE.

FREDERICK MERTSHEIMER AND JOB A. EDSON, OF KANSAS CITY, MISSOURI.

GRADING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 654,836, dated July 31, 1900.

Application filed April 16, 1900. Serial No. 13,056. (No model.)

To all whom it may concern:

Be it known that we, FREDERICK MERTSHEIMER and JOB A. EDSON, of Kansas City, county of Jackson, and State of Missouri, have
5 invented a new and useful Improvement in Grading-Machines, of which the following is a specification.

This invention has reference to a grading-machine designed more particularly for distributing dirt at the sides of railroads to give
10 the banks the proper level and slope, such machines comprising usually a scraper-blade supported by a car traveling on the rails and adapted to act at the sides of the track.

15 The invention consists in various improvements in machines of this character directed more particularly to the form and construction of the scraper-blade, the means for sustaining it on the car to provide for its various
20 adjustments and for folding it at the side of the car when not in use, and to various other features, as will be fully described hereinafter.

In the accompanying drawings, Figure 1 is
25 a front elevation of the machine with one of the scraper-blades extended for use and the other folded along the side of the car. Fig. 2 is a side elevation of the same as viewed in the direction of the arrow in Fig. 1, with the
30 scraper folded. Fig. 3 is a top plan view of the machine with the parts in the position shown in Fig. 1. Fig. 4 is a vertical sectional elevation, on an enlarged scale, on the lines *a a* and *b b* of Fig. 1, as viewed in the
35 direction of the dotted arrow, showing how the lower edge of the extension-wing of the main blade is permitted to yield when encountering obstructions. Fig. 5 is a horizontal
40 section, on an enlarged scale, on the line *c c* of Fig. 1, showing how the distributing-wing is connected adjustably with the main blade. Fig. 6 is a horizontal section on the line *d d*
45 of Fig. 1, showing how the auxiliary sloping blade is adjustably connected with the main blade. Fig. 7 is an elevation of the upper
50 end of the cylinder for raising the scraper-blade, showing the valve for the admission of air to the cylinder in section, the parts being on an enlarged scale. Fig. 8 is an end elevation of the valve-disk for controlling the admission of air to and its exhaust from the cylinder. Fig. 9 is a horizontal sectional plan,

on an enlarged scale, through the extension-wing, showing the stop devices by which it is held to its work.

Referring to the drawings, 1 represents a
55 platform-car appropriately constructed to give the requisite strength to sustain the operative parts of the machine, comprising main scraper-blades 2, mounted at opposite
60 sides of the car to travel along the sides of the track, and their operating-cylinders 3, mounted on the car, with their pistons suitably connected with the blades, as more fully described hereinafter, to raise and lower them,
65 and as these parts—the blades and operating mechanisms—are the same on both sides of the car a description of one set will suffice for both.

The main blade is constructed, preferably,
70 of heavy planking having on its bottom a metallic cutting edge 4 to prevent wearing. At its inner end it is connected to the car in such manner that it may be swung around on a
75 vertical axis and raised or lowered, and this is effected by erecting on the car a vertical transverse frame 5, consisting of two uprights
6, connected at their upper ends by a cross-beam 7. At the outer side of the upright
80 there is sustained a short distance from it a vertical cylindrical rod 8, with its lower end resting in a bracket on the under side of the frame of the car. This rod is loosely encircled by three sleeves 9, 10, and 11, which are
85 fixed to the main blade to constitute a hinged connection of the blade with the rod. The sleeve 9 is sustained some distance above the upper edge of the blade on the end of a brace-
90 bar 12, extending diagonally outward and downward, with its lower end firmly secured to the blade. Adjacent to the sleeve the brace
has connected to it the upper end of a vertical rod 13, whose lower end is fixed to the
blade at its inner edge. The sleeve 10 is fixed
95 to the upper edge of the blade, while the lower sleeve 11 is fixed a short distance below it. These sleeves and their brace-rods described afford a strong and effective hinged connection for the blade, permitting it to be swung
100 from alongside the car outwardly to an operative position at an angle and permitting it to be raised and lowered on the vertical rod 8 as a guideway. When in operation the blade projects from the side of the car at an angle,

as shown in Fig. 3, and when in this position is sustained at its outer end by a chain 14, jointed at its lower end near the outer end of the blade and at its upper end to the cross-beam 7. It is held to its work by two brace-rods 15 and 16, adapted to be set with their forward ends against the rear face of the blade and with their rear ends against the side of the car, one above the other. The ends of these rods are seated between vertical ears 16^x on the blade and car and pivotally secured by horizontal pins 17, passing through the ears and rods. By thus connecting the rods they will not interfere with the vertical adjustments of the blade, the connection of their inner ends with the car and blade acting pivotally when the blade is raised. When the blade is folded, the pins are withdrawn and the rods detached and may be carried at the side of the car in stirrups 18, Fig. 2. Near its connection with the car the blade has jointed to it the rear end of a draft-chain 19, whose forward end is connected to the car-body, the purpose of which is to hold the blade properly to its working position without interfering with its vertical movement. On its rear side the blade is further connected with the car-body by a chain 20.

The elevation of the blade is effected by the cylinder 3, before alluded to, by means of a cable 21, fixed at a balancing-point on the blade and passing over a swiveling pulley 22 on the upper cross-beam 7. The end of the cable is fixed to a rod 23, passing through the end of the cylinder and connected to the piston therein. By this means when the piston descends the blade will be raised, and vice versa. We propose to operate the piston by compressed air, which may be taken from any suitable source; but we have shown the car as provided with an air-tank 24, with a connecting-hose 25 extending to a central supply-pipe 26, from which the vertical cylinders are supplied by branch pipes 27. The branch pipe 27 communicates through valve 28 with the upper end of the cylinder, which valve is so formed that when in one position air will be admitted to the cylinder, causing the descent of the piston and the elevation of blade, and when in its other position the air-supply will be cut off from the cylinder and a communication established between the cylinder and the outside air. This will permit the piston to rise and the blade to descend by its own weight. This valve consists of a cylindrical casing 29, sustained at the upper end of the cylinder and having an interior chamber 30, in which is mounted to oscillate a valve-disk 31, provided with a stem 32, passing out through the end of the casing and formed to receive a handle 33 for turning it. At one side the casing is provided with an opening, through which the air enters the chamber 30 from the branch pipe 27, as shown in Fig. 7, and when the valve is in the position there indicated the air passes from said chamber through an opening 34 in the

disk and through an opening 35 in the casing, communicating with the chamber and connected by a pipe 36 with the upper end of the cylinder. The casing has, further, a central longitudinal exhaust-opening 37, which is adapted to be connected with opening 34 in order to permit the air in the cylinder to return through the exhaust-opening. The connection of these openings is effected by means of a radial recess 38 in the face of the valve-disk 31, so formed and arranged that when the disk is turned to the proper position it will carry its opening 34 out of communication with opening 35, so as to cut off the supply to the cylinder, and will bring the end of the radial passage 38 in line with opening 35, the result being that the exhaust will pass through the radial recess and thence out through the longitudinal exhaust-opening. The cylinder is mounted on the car so as to have a limited movement at its upper end transversely of its longitudinal axis, to the end that its piston may act with a direct pull on the cable notwithstanding any changes in the position of the pulley due to the different positions of the main blade. To provide for this movement of the cylinder, a rounded head A projects from its lower end and is set loosely in a socket-plate B on the floor of the car, the result of which is that at its upper end the cylinder has a limited movement. It is maintained in a substantially-upright position by a band D encircling the same and somewhat larger in diameter to admit of a limited play therein.

From this description it will be seen that when the blade is operating it is held firmly to its work by the chains and braces, so connected that they will not interfere with the vertical movement of the blade to avoid obstructions. It will be seen also that by the disconnection of the braces and draft-chain the blade may be lifted by the operating-cylinder and swung around at the side of the car when it is not to be used or when it is desired to pass side obstructions, such as standing cars or bridge-framings or the like.

As the machine frequently follows in the path of ballast-cars and ditching-machines to distribute and level off the dirt dumped along the sides of the track, it is important that means be provided for freeing the ties at the side of the rails and also the latter from any dirt which may lodge thereon. This is accomplished by an extension-wing 39, hinged on a vertical axis 40 on the front-face of the main blade near its inner end, so that the wing may be swung beneath the car over the ends of the ties and adjacent to the rails, as shown in Fig. 1. The lower edge of this wing is horizontal and is at a higher level than the lower edge of the main blade, so as to closely overlie the upper sides of the projecting ends of the ties in order to effectually free them from any lodging dirt. At its inner lower corner the wing is recessed, so as to extend at the side of the rail and at the top

of the same for the purpose of freeing it of dirt. It is seen, therefore, that this wing acts independently of the main blade closely along the upper sides of the ties and at the sides and tops of the rails. This wing is maintained in line with the main blade and held in working position by rods 41, projecting forward from the frame of the car, with their ends adapted to pass through openings in the wing. The rods are provided adjacent to their ends with shoulders 42, against which the wing rests and by which it is held to its work. The wing is in two sections, an upper main body portion 43 and a lower section 44, which latter is so connected with the body that it may yield rearward to pass over obstructions, such as projecting rocks between the ties or an abnormally-high tie. To accomplish this, the lower section is hinged to the body portion, as at 45, Fig. 4, and is held yielding in the same general plane of the body by two spiral springs 46, encircling rods 47, jointed to lugs 48 on the lower section and passing loosely through lugs 49 on the body, the springs bearing between the two lugs. The springs are of such strength that under normal conditions they will hold the lower section of the wing in operative position and the latter will act to properly distribute the dirt. If, however, an obstruction is encountered, the springs will yield and permit the lower section to turn backwardly, and after the obstruction is passed the section will be quickly returned to its normal working position.

In order that the dirt may be properly distributed close up to the ends of the ties notwithstanding variations in their length, which often occurs, we provide the main blade at its inner end with a plate 50, adjustably connected thereto in such manner that it may be set at different points in the line of the main blade to bring its inner edge close to the ends of the ties. This plate is secured to the blade by bolts 51, passing through long slots 52 in the plate.

For the purpose of giving the outer edge of the bank the proper slope for drainage we provide a sloping wing 53, having its lower edge inclined outwardly and downwardly, as shown in Fig. 1. This wing is adapted to be attached to the bottom of the main blade to form a continuation of its lower edge and is adjustably connected thereto in order that it may be set at various points in the length of the plate, according to the width the bank is to be given. It is attached to the main blade by means of lugs 54, Fig. 6, on the back of the wing, adapted to pass through openings through the blade, to which the lugs are secured by pins 55, extending through holes in the ends of the lugs at the back of the blade. The main blade is provided throughout its length with openings to receive these lugs, so that the wing may be changed from place to place, as desired. The leveling-blade being set while in operation at an angle, as shown

in Fig. 3, acts in advancing to gradually deflect the superfluous dirt rearwardly along its face. In order, however, that the dirt may be carried forward to fill up weak places and depressions in the bank, we provide a distributing-wing 56, consisting of a vertical plate hinged at its inner edge to the face of the main blade, as at 57, in such manner that it may be swung outward to extend at an angle to the blade, as shown more particularly in Fig. 3. This plate has hinged to its free end legs 58, adapted to engage, respectively, notched plates 59, fixed at the top and bottom of the main blade, so that it may be set at different angles by engaging the legs in the notches, according to the nature of the work to be performed, as regards the amount of dirt to be carried forward. We propose to provide for the connection of this wing adjustably to the main blade in order that it may be set at different points in the length of the blade to advance the dirt in a narrow or wide path, as desired. To effect this, the inner edge of the wing has extending from its hinged joint a plate 60, to which are fixed three lugs 61, adapted to extend through holes in the main blade and be firmly secured thereto by a long pin 62, extending through perforations in the ends of the lugs. At intervals along the main blade other holes 61^x are provided to receive these lugs, so that by the movement of the long pin the wing may be secured at different points. When the conditions are such that it is not necessary to employ this distributing-wing, it may be folded flat against the face of the plate and held in position by a pin 63, adapted to be passed through perforated lugs 63^x on the legs, which lugs are adapted in turn to extend through holes in the blade.

In operation the scraper-blade is lowered to the position shown at the left in Figs. 1 and 2 and is held at an angle and to its work by the brace-bars 15 and the draft-chain 19. When the blade is to be folded for transportation, the brace-bars are removed and placed in the receiving-stirrups, the draft-chain detached, and the air-valve operated to admit air to the top of the cylinder. This will cause the piston to descend and the blade to be raised, when it may be swung around to the side of the car, as shown in Fig. 2 and to the right in Figs. 1 and 3. In this position straps 64, fixed to the upper edge of the main blade, pass over lugs 65, projecting from the side of the car, and the blade is held in folded position by pins 66, passed through perforations in the lugs, as shown in Figs. 2 and 3.

The extension-wing 39, before alluded to, has its inner lower corner recessed, as shown in Fig. 1, so that it may overhang the rail to free the same of dirt. By reason of its being hinged at its inner edge to the face of the main blade it may be placed flat against the main blade, so as not to present any projecting surface when the main blade is folded at the side of the car.

Having thus described our invention, what we claim is—

1. The combination with the car, of the laterally-swinging and vertically-movable scraper-blade mounted thereon, a cylinder sustained by the car in an upright position and movable laterally at its upper end, a piston and piston-rod for said cylinder, a guide situated above the cylinder, a cable passing over said guide and attached at its ends respectively to the piston-rod and scraper-blade, and means for admitting fluid under pressure into the cylinder above the piston.

2. The combination with the car, of the laterally-swinging vertically-movable scraper-blade mounted thereon, an upright cylinder movable laterally at its upper end, a piston and piston-rod therefor, a vertical guide-pulley mounted above the cylinder in a bearing-frame movable on a vertical axis, a cable passing over the pulley with one end connected with the scraper-blade and the other end with the piston-rod, and means for admitting a fluid under pressure to the cylinder above the piston.

3. The combination with the car, of the main scraper-blade sustained thereby at the side of the track and terminating at the ends of the ties, and an extension-wing adapted to extend beneath the car with its lower edge horizontal and at a higher level than the lower edge of the blade and closely overlying the upper sides of the ties and having its inner lower corner recessed to extend at the sides of the rails and closely at the tops of the same.

4. The combination with the car, of the scraper-blade sustained thereby to act at the side of the track, and a horizontally-swinging extension-wing sustained by the scraper-blade and adapted to act beneath the car.

5. In combination with the car, a scraper-blade sustained thereby to act at the side of the car, and an extension-wing pivoted to the scraper-blade and adapted to be swung under the car adjacent to the rails.

6. In combination with the car, a scraper-blade mounted at its inner end on the car and adapted to be folded at the side of the same, and an extension-wing pivoted near the inner end of the blade to fold flatly against the same and adapted to be swung beneath the car adjacent to the rail; whereby when the main blade is folded at the side of the car the extension-wing may be placed flat against its face.

7. The combination with the car, of the extension-wing having its lower edge movable rearward with respect to the upper portion; whereby the lower portion of the blade will yield in encountering obstructions.

8. The combination with the car, of the extension-wing comprising an upper main body and a lower horizontal section, and a spring acting to hold the lower section in an operative position; whereby the lower section may yield in encountering obstructions.

9. The combination with the car, of the

extension-wing comprising an upper body portion and a lower horizontal section forming a continuation of the body portion, lugs on said parts, a rod jointed to the lug of the lower section and passing loosely through the lug on the body portion, a spiral spring encircling the rod and bearing between the lugs, and a hinged connection between the lower section and body portion.

10. The combination with the car of the scraper-blade sustained thereby to act at the side of the track, an extension-wing pivoted at one end only to swing beneath the car, and a stop on the car to limit the rearward motion of the wing.

11. The combination with the car, of the extension-wing mounted to swing beneath the same and provided with an opening, a rod extending from the car with its end in position to extend through said opening when the blade is swung to an operative position, and a shoulder on said rod adapted to limit the rearward movement of the blade.

12. In combination with the car, a scraper-blade formed with a lower scraping edge adapted to act at the side of the track and terminating at the ends of the ties, and a plate connected adjustably with the blade at its inner end and provided with a lower scraping edge forming a continuation of the lower edge of the blade, said plate adapted to be adjusted close up to the ends of the ties.

13. In combination with the car, a scraper-blade sustained thereby, to act at the side of the track, an adjustable blade at the inner edge of the blade adapted to be set close up to the ends of the ties, and an extension-wing adapted to extend over the ends of the ties.

14. In combination with the car, a main scraper-blade sustained thereby and provided with a lower scraping edge adapted to act at the side of the track, and a sloping wing adjustably connected with the main blade near its outer end and formed with a lower edge sloping outward and downward and forming a continuation of the lower active edge of the scraper-blade.

15. In combination with the car, a scraper-blade adapted to act at the side of the track at an inclination with respect to the car, and a distributing-wing applied to the front face of the scraper-blade and adapted to extend at an angle thereto.

16. In combination with the car, a main blade sustained thereby at an inclination to act at the side of the car, a distributing-wing on the face of the blade, and means for varying the angle of the same with respect to the blade.

17. In combination with the car, a scraper-blade extending at an inclination with the same to act at the side of the track, a distributing-wing consisting of a vertical plate hinged at its inner end to the face of the blade on a vertical axis, and means for sustaining its outer end so that it will extend at an inclination with respect to the blade.

18. In combination with the car, a scraper-blade extending at an inclination to the same to act at the side of the track, a distributing-wing consisting of a vertical plate hinged at its inner end to the face of the blade on a vertical axis, and a supporting-leg pivoted at the opposite end of the plate and adapted to engage the blade; whereby the distributing-wing may be adjusted at different inclinations with respect to the scraper-blade.

19. In combination with the car a scraper-blade sustained thereby at an inclination to act at the side of the track, a distributing-wing adjustably connected to the face of the blade and adapted to extend at an angle to the same.

20. In combination with a car, a scraper-blade extending at an inclination at the side of the car, a distributing-wing pivoted at its inner end to the blade, and means for changing the point of attachment of the wing with the blade in the direction of the length of the blade.

21. The combination with the car of the swinging scraper-blade adapted to be folded at the side of the same, an extension-wing pivoted to the face of the blade near its inner end, and adapted to fold flatly against the same, and a distributing-wing pivoted to the face of the blade beyond the extension-wing, and adapted also to fold flatly against the

blade; whereby when the scraper-blade is folded at the side of the car the extension-wing and distributing-wing may be adjusted flat against the face of the same.

22. In combination with the car, a scraper-blade pivoted at its inner end thereto, means for raising and lowering the same, and a brace-rod having its ends detachably connected on horizontal axes respectively with the scraper-blade and car.

23. The combination with the car, of the vertically-movable scraper-blades sustained on opposite sides thereof, two cylinders sustained by the car and provided with pistons, cables connecting the pistons with the respective blades, independently-acting valves for controlling the admission of fluid under pressure to the respective cylinders, a supply-pipe for the fluid under pressure, common to both cylinders and branch pipes extending from said supply-pipe to the respective valves; whereby the blades may be operated one independently of the other.

In testimony whereof we hereunto set our hands, this 2d day of April, 1900, in the presence of two attesting witnesses.

FREDERICK MERTSHEIMER.

JOB A. EDSON.

Witnesses:

JOHN W. SHAW,

W. B. DUNLEVY.