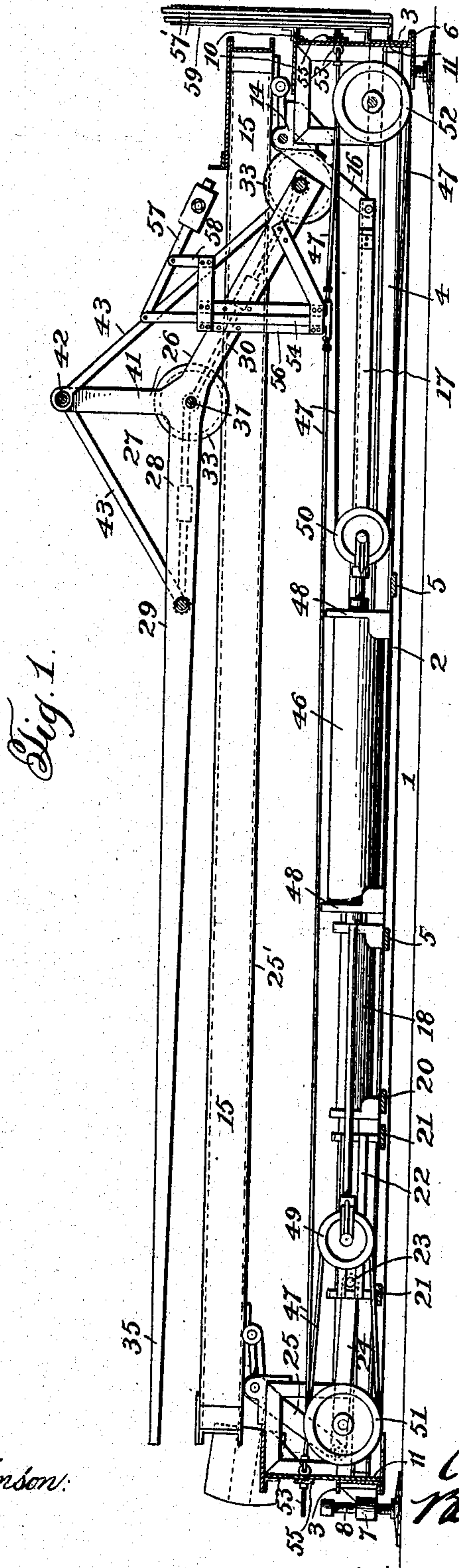


No. 885,925.

PATENTED APR. 28, 1908.

C. N. HOOPER.
SERVING APPARATUS.
APPLICATION FILED MAY 29, 1907.

6 SHEETS—SHEET 1.



Witnesses:

Jas. E. Hutchinson.
Geo. D. Riley.

Inventor:

Charles N. Hooper, By
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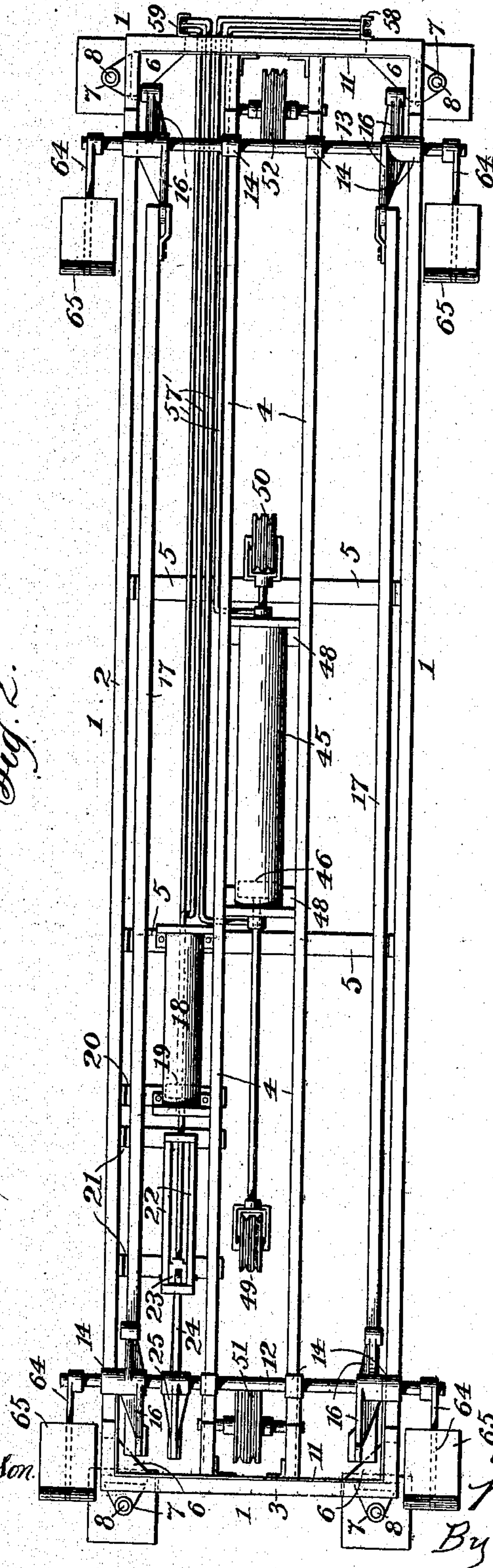
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5 SHEETS—SHEET 2.

Fig. 2.



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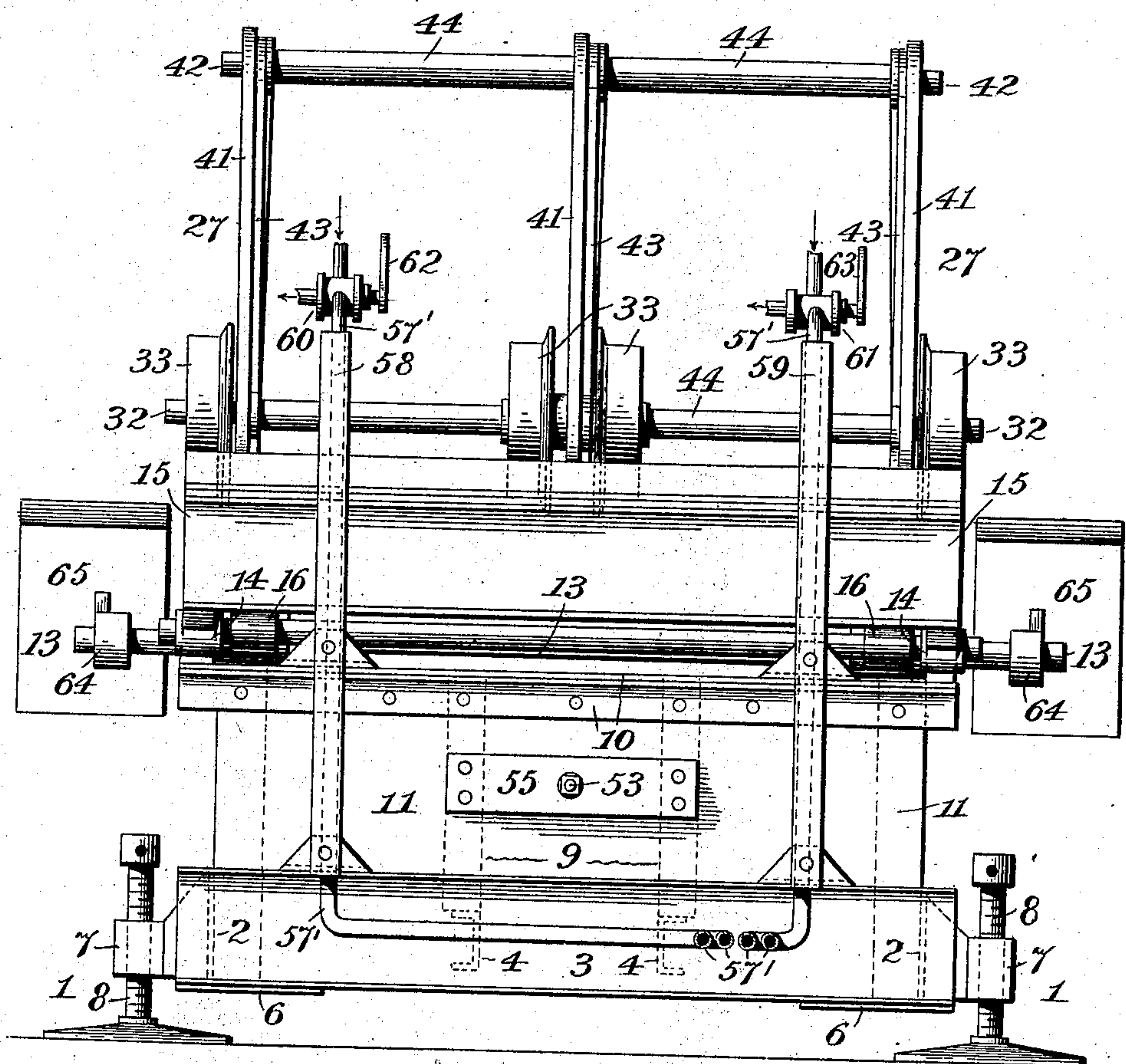
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5 SHEETS—SHEET 3.

Fig. 3.



Witnesses:
Jas. Hutchinson
Geo. Riley

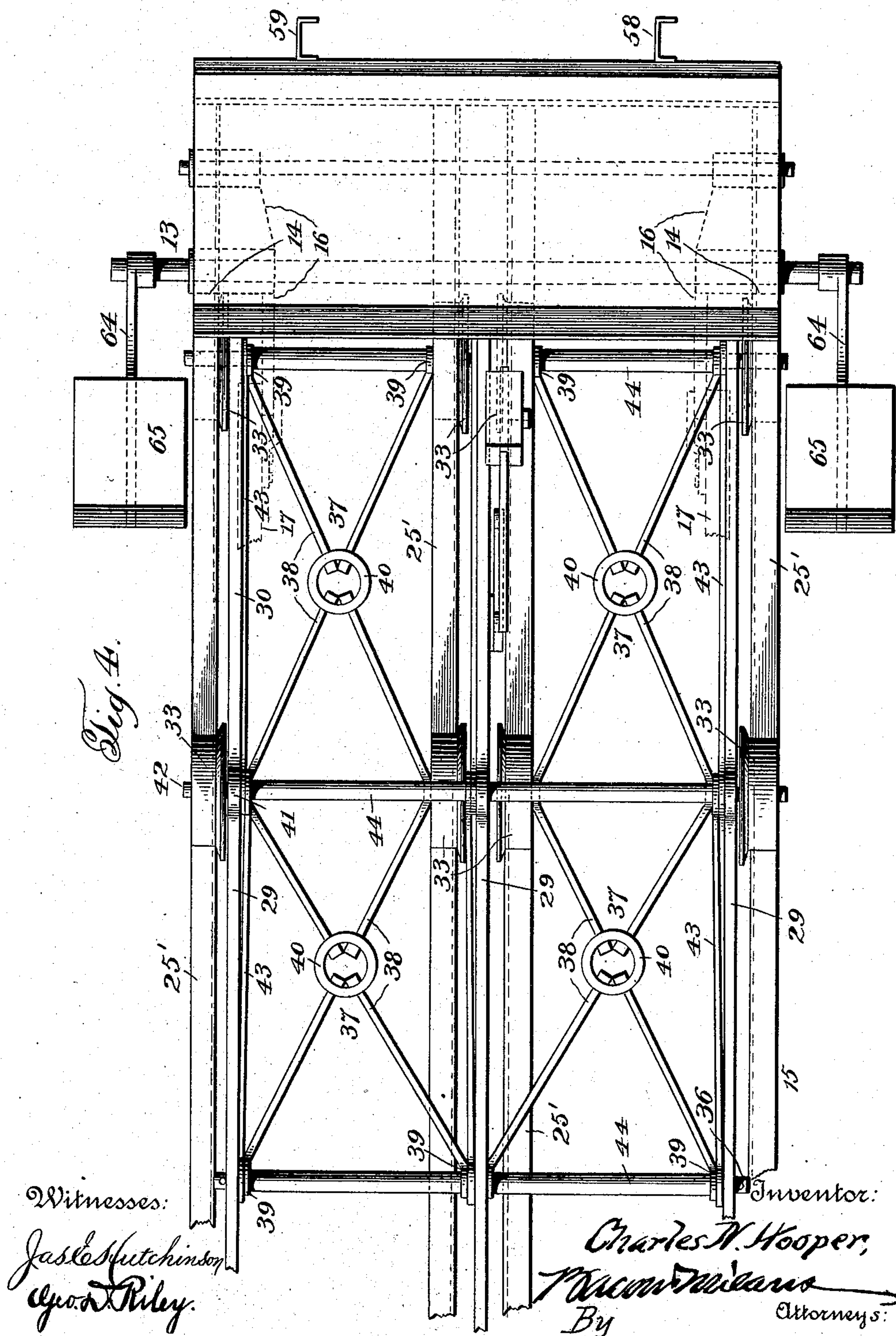
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5 SHEETS—SHEET 4.

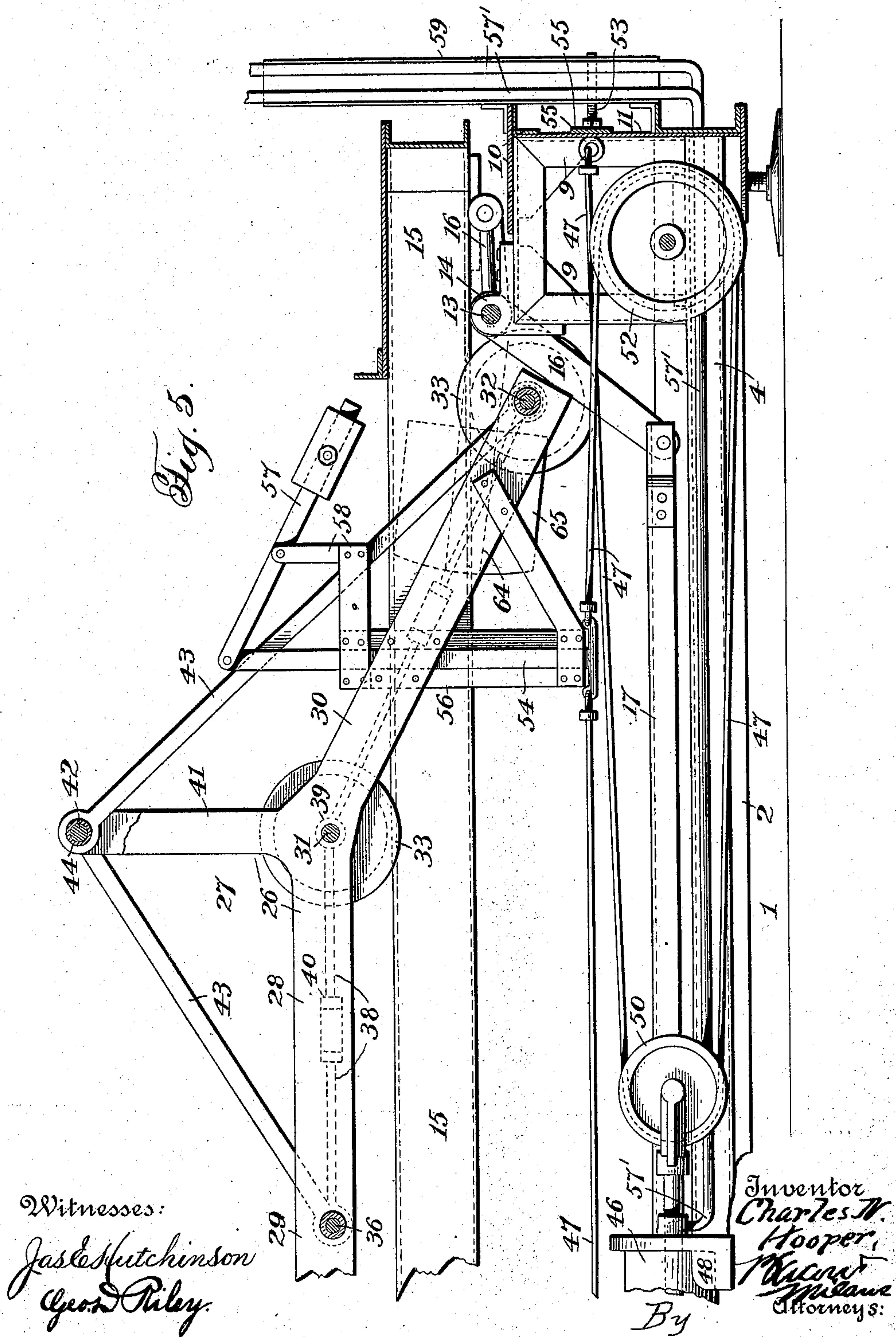


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APPLICATION FILED MAY 29, 1907.

5 SHEETS—SHEET 5.



UNITED STATES PATENT OFFICE.

CHARLES NELSON HOOPER, OF DUBUQUE, IOWA.

SERVING APPARATUS.

No. 885,925.

Specification of Letters Patent.

Patented April 28, 1908.

Application filed May 29, 1907. Serial No. 376,332.

To all whom it may concern:

Be it known that I, CHARLES N. HOOPER, a citizen of the United States, residing at Dubuque, in the county of Dubuque and State of Iowa, have invented certain new and useful Improvements in Serving Apparatus, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to serving apparatus for furnaces, and while susceptible of use for charging furnaces for various purposes, is especially designed to be employed in the manufacture of enamel ware, for carrying into the enameling furnace and lowering upon the furnace supports the articles or material to be treated and for lifting and withdrawing the same therefrom.

The present invention aims to provide an improved apparatus for this purpose, whereby manual power is rendered practically unnecessary, and an increase in general efficiency and convenience secured.

In its general nature, the invention comprehends a horizontally and vertically movable serving fork and motor-power actuated means therefor, the fork being provided with a carriage adapted for reciprocation along horizontally disposed track sections, which are arranged to be moved vertically.

An important feature of the invention resides in the provision of improved motor-power actuated means for giving the fork its horizontal movement and in the particular arrangement and connection thereof with the fork carriage, whereby the track sections are adapted to be moved vertically independently of said means while maintaining the connection with the carriage.

A further object of the invention is to improve the construction of the fork to prevent straining and springing and to increase its capacity.

Other objects and advantages will appear from the annexed detailed description.

An embodiment of the invention comprises the construction and arrangement of parts, hereinafter described, illustrated in the accompanying drawings, and particularly pointed out in the claims hereto appended.

In the drawings; Figure 1 is a vertical longitudinal sectional view of an apparatus constructed in accordance with the present invention. Fig. 2 is a top plan view, the ver-

tically movable track frame and serving fork being removed. Fig. 3 is an end elevation on an enlarged scale. Fig. 4 is a view on an enlarged scale illustrating the manner of constructing the inner portion of the serving fork. Fig. 5 is a view showing the parts seen at the right of Fig. 1, on an enlarged scale.

Referring to a detailed description of the drawings, wherein like reference characters designate corresponding parts throughout the several views, 1 designates a supporting base for the apparatus, comprising side sills 2, end sills 3, and intermediate longitudinal center sills 4, all of channeled iron, the center sills being fastened to the end sills by angle brackets and the side and end sills being connected by transverse braces 5 and corner plates 6, the latter having sleeves 7, with which are associated leveling jack screws 8. At each end of the base are four risers 9 made up of angle bars and securely tied together by transverse plates 10 and side plates 11 to provide strong and rigid supports for rock shafts 12 and 13, which are mounted in bearings 14, secured thereto.

15 designates a track section frame supported above the base 1 in a horizontal position upon bell crank levers 16, which are keyed to the rock shafts 12 and 13 and have a pivotal connection at their upper ends with said frame. The levers 16 are correspondingly arranged and the lower ends of the levers on shaft 12 are connected with the lower ends of the levers on shaft 13 by links 17 extending along opposite sides of the base, so that by rotating one of said shafts the frame 15 will be moved vertically in a horizontal plane. For giving the frame this movement I provide motor power in the nature of a fluid cylinder and piston 18 and 19. The cylinder 18 is supported at one side of the base, being bolted at one end to one of the transverse braces 5, and at its other end to a short transverse member 20 provided for this purpose. Similar supports 21 are provided for guides 22 for a cross head 23 at the outer end of the piston rod of the piston 19, which is operatively connected with the rock shaft 12 through the medium of a pitman 24 and a crank 25 keyed to said shaft.

The track section frame is composed of four longitudinal channel members 25' securely fastened together to provide a rigid

structure, the members 25' being arranged parallel and spaced to constitute track sections.

26 designates a serving fork constructed in accordance with the present invention, said fork comprising a carriage 27 adapted to be supported by the track sections for travel thereupon and consisting of a plurality of members 28, three being shown in the present instance, each of which is provided with a portion 29 extending horizontally above the track sections and a portion 30 extending rearwardly and downwardly to a point below the track section frame. The members 28, which are arranged in parallel relation and at equal distances apart are connected by a shaft 31 passing through the members at the junction of their portions 29 and 30, and by a shaft 32 passing through the members at the outer ends of their portions 30. Journalled on the shafts 31 and 32 are flanged wheels 33, the wheels on the shaft 31 bearing downwardly on the track sections and the wheels on shaft 32 bearing upwardly thereagainst, there being four wheels on each shaft, two arranged at the ends of the shaft to contact with the two outside track sections and two arranged on either side of the central member to engage the two inside sections of track.

Extending forwardly from the horizontal portions 29 and suitably secured thereto are members 35, constituting the tines of the serving fork. As will be understood the tines of the fork have to be of considerable length and the material handled is placed upon the outer ends of the tines so that there is considerable strain at the inner extremities thereof or at a point near their connection to the carriage. In order therefore to prevent the tines from springing, bending or twisting, to strengthen the carriage and maintain the wheels thereof in proper relation with the track sections, I provide the following structure. The tines gradually increase in cross section, as they near the point of greatest strain and are connected near their inner ends by a shaft 36 passing there-through and provided with suitable securing means at its ends.

37 designates cross bracing arranged between the members 28 and between the inner ends of the tines and connecting the shafts 31, 32 and 36. The cross bracing consists of rods 38 provided at one end with eyes 39 to embrace the shafts and extending diagonally to and adjustably connected with a central ring 40, the inner ends of the rods passing through openings in the ring 40 and being screw-threaded for clamping nuts. The members 28 at the junction of their portions 29 and 30 are provided with upwardly extending vertical arms or struts 41, which are connected by a shaft 42 passing through the upper ends thereof and shaft 41

is connected with shafts 31 and 32 by truss members 43 consisting of straight rods provided with eyes at their ends for engagement with said shafts. The cross bracing and truss members, as well as the carriage wheels are held in place or properly spaced by pipe spreaders 44 slipped over the shafts.

The motor power for moving the serving fork horizontally along the track section frame consists of a fluid cylinder and piston 45 and 46, the movements of the piston 45 being transmitted to the carriage through the medium of a cable 47 connected therewith. The cylinder 45 is arranged longitudinally and centrally of the base, and is securely bolted to transverse braces 48 thereof. The piston rod of the piston 46 extends from opposite ends of the cylinder and is provided at its ends with pulleys 49 and 50.

Arranged at opposite ends of the base 1 in alinement with the pulleys 49 and 50 are stationary pulleys 51, 52, the axles of the pulleys being mounted in journal boxes secured to the intermediate longitudinal sills 4. The cable 47 consists of two sections of wire rope, each section being secured to a bolt 53 at one end of the base and passing down around one of the pulleys of the piston rod and up and around one of the stationary pulleys and connecting with a rod 54, said rod being formed at its lower end into a tee, with eyes for securing the ends of the cable. The bolts 53 are securely fastened to members 55 bolted to the central risers 9 and said bolts are adapted to be adjusted to tighten the cable. The rod 54 is adapted to slidably engage a slide member or bracket 56 rigidly secured to one of the members 28 to provide a vertically adjustable connection between the cable and the carriage of the serving fork to allow for the vertical movement of the track section frame and fork independently of the cable, which is stationary with respect to vertical movement, so that an operative or direct connection between the cable and the fork is always maintained irrespective of the vertical movement of the latter. The rod 54 is of a length to permit sufficient vertical play of the slide 56 on the rod, said rod extending upwardly through and projecting above the slide and being provided with a counterbalance to prevent the rod from dropping down in the event of the cable becoming slack. Said counterbalance consists of a weighted lever 57 pivoted to a bracket 58 of the slide 56 and connected at one end with the upper end of the rod 54. It is to be noted that by this arrangement I am permitted to mount the power mechanism entirely out of the way, and in a convenient manner on the supporting base 1, which as set forth is of a character particularly adapted to withstand the wear and strain incident to the use of such mechanism.

The inlet and outlet of the actuating fluid

to the ends of the cylinders, for the purpose of forcing the pistons to either end of the cylinders, is controlled through distributing channels 57' supported by the base 1 and extending from said cylinders to the rear of the apparatus and upwardly along vertical members 58 and 59 to suitable controlling valves 60 and 61, which are arranged at a convenient height and provided with operating levers 62, 63.

The rock shafts 12 and 13 are provided with cranks 64 keyed thereto to receive weights 65 adjustably secured thereon to act as a counterbalance for the dead load of the track section frame and fork, so that in moving the fork vertically only sufficient power to handle the live load is necessary.

As will be readily understood the apparatus is to be set up adjacent the door of an enameling furnace, and the fork is adapted to receive a load of material and to be moved horizontally to convey the material within the furnace and to be moved vertically to lower the same upon the furnace supports. In the act of taking the charge from the furnace the fork is run into the furnace, raised vertically to lift the charge from the furnace supports and then withdrawn.

It will be understood that various changes within the scope of the claims hereto appended may be made in the construction and arrangement of parts hereinbefore described without departing from the spirit or sacrificing any of the advantages of the invention.

Having thus described the invention, what is claimed is:—

1. In an apparatus of the class described, a vertically movable track, a load handling device supported for travel horizontally upon the track, and actuating means mounted independently of the track to move the load handling device horizontally.

2. In an apparatus of the class described, a vertically movable track, a load handling device supported for travel horizontally upon the track, actuating means mounted independently of the track, and an adjustable connection between said actuating means and the load handling device.

3. In an apparatus of the class described, a vertically movable track, a load handling device supported for travel horizontally upon the track, actuating means mounted independently of the track, and a vertically adjustable connection between said actuating means and the load handling device.

4. In an apparatus of the class described, a vertically movable track, a load handling device supported for travel horizontally upon the track, actuating means mounted independently of the track, and an extensible connection between said actuating means and the load handling device.

5. In an apparatus of the class described, a supporting base, a vertically movable

track, a load handling device supported for travel horizontally upon the track, and actuating means mounted on the supporting base to move the load handling device horizontally.

6. In an apparatus of the class described, a supporting base, a vertically movable track, a serving device supported for travel horizontally upon the track, actuating means for the track mounted on the supporting base, and actuating means mounted on the base to move the load handling device horizontally.

7. In an apparatus of the class described, a vertically movable track, a load handling device supported for travel horizontally upon the track, actuating means for the track, actuating means to move the load handling device horizontally, a vertically sliding connection between the load handling device and the last mentioned actuating means, said connection comprising a rod connected with the actuating means, and a slide secured to the load handling device.

8. In an apparatus of the class described, a vertically movable track, a load handling device supported for travel horizontally upon the track, actuating means for the track, actuating means to move the load handling device horizontally, a vertically sliding connection between the load handling device and the last mentioned actuating means, said connection comprising a rod connected with the actuating means, a slide secured to the load handling device, and a counterbalance for said rod.

9. In an apparatus of the class described, a supporting base, a vertically movable track, a load handling device supported for travel horizontally upon the track, a motor mounted on the base, a flexible transmission member associated with the motor, and an adjustable connection between the flexible transmission member and the load handling device.

10. In an apparatus of the class described, a supporting base, a vertically movable track, a load handling device supported for travel horizontally upon the track, a fluid cylinder and piston mounted on the base, said piston having a piston rod extending from the ends of the cylinder and provided with pulleys at its ends, stationary pulleys mounted at the ends of the base, a cable connected at each end to the base and passing around the pulleys to provide a stretch of cable movable horizontally, and a vertically sliding connection between the cable and the load handling device.

11. In an apparatus of the class described, a serving fork including a carriage comprising a plurality of parallel members, each of said members having a horizontal portion and a downwardly and rearwardly extending portion, transverse members connecting the

parallel members, wheels journaled on said transverse members, and members extending forwardly from the horizontal portions of the parallel members and connected thereto to constitute the tines of the serving fork.

12. In an apparatus of the class described, a serving fork including a carriage comprising a plurality of parallel members, each of said members having a horizontal portion and a downwardly and rearwardly extending portion, transverse members connecting the parallel members, wheels journaled on said transverse members, members extending forwardly from the horizontal portions of the parallel members and connected thereto to constitute the tines of the serving fork, and transverse bracing arranged between the parallel members and the inner extremities of the tines.

13. In an apparatus of the class described, a serving fork including a carriage comprising a plurality of parallel members, each of said members having a horizontal portion and a vertical strut, members constituting the tines of the fork extending forwardly from and connected to the horizontal portions, and trusses having a connection with the struts and the tines of the fork.

14. In an apparatus of the class described, a serving fork including a carriage comprising a plurality of parallel members, each of said members having a horizontal portion, a downwardly and rearwardly extending portion, and a vertical strut, and trusses having a connection with the vertical struts and the downwardly and rearwardly extending portions.

15. In an apparatus of the class described, a serving fork including a carriage comprising a plurality of parallel members, each of said members having a horizontal portion, a downwardly and rearwardly extending portion and a vertical strut, transverse members connecting the parallel members at the ends of the downwardly and rearwardly extending portions and at the upper ends of the vertical struts, members extending forwardly from and connected to the horizontal portions of the parallel members and constituting the tines of the fork, trusses connecting the transverse members, and trusses connected to one of the transverse members and having connections with the tines of the fork.

16. In an apparatus of the class described, a serving fork including a carriage comprising a plurality of parallel members, each of said members having a horizontal portion and a downwardly and rearwardly extending portion, members extending forwardly from and connected to the horizontal portions to constitute the tines of the fork, a transverse member connecting the tines of the fork, transverse members connecting the parallel members at the ends of the downwardly and rearwardly extending members, and at the

juncture of the horizontal members and the downwardly and rearwardly extending members, and transverse bracing between the parallel members and the tines of the fork, said bracing connecting all of the transverse members.

17. In an apparatus of the class described, a serving fork including a carriage comprising a plurality of parallel members, each of said members having a horizontal portion and a downwardly and rearwardly extending portion, members extending forwardly from and connected to the horizontal portions to constitute the tines of the fork, a transverse member connecting the tines of the fork, transverse members connecting the parallel members at the ends of the downwardly and rearwardly extending members, and at the juncture of the horizontal members, and transverse bracing between the parallel members and the tines of the fork, said bracing connecting all of the transverse members, and supporting wheels journaled on the two transverse members that connect the parallel members.

18. In an apparatus of the class described, a serving fork including a carriage comprising a plurality of parallel members, each of said members having a horizontal portion, a downwardly and rearwardly extending portion and vertical struts, and members extending forwardly from said horizontal portions and constituting the tines of the fork, transverse members connecting the tines of the fork, and transverse members connecting the parallel members at the outer ends of the downwardly and rearwardly extending portions and at the upper ends of the vertical struts, and truss members connecting the transverse members.

19. In an apparatus of the class described, a supporting base, a track movable vertically in a horizontal plane, levers pivoted to the base to support and move the track, and actuating means for the levers.

20. In an apparatus of the class described, a track movable vertically in a horizontal plane, rock shafts mounted on the base, levers fast to the rock shafts and connected to the track to support and move the same, counterbalance weights connected to the rock shafts, and actuating means for said levers.

21. In an apparatus of the class described, a supporting base, a track movable vertically in a horizontal plane, rock shafts mounted on the base, levers fast to the rock shafts to support and move the track, a crank connected to one of the rock shafts, and a motor to actuate the levers connected with said crank.

22. In an apparatus of the class described, a serving fork including a carriage comprising a plurality of parallel members, each of said members having a horizontal portion, a downwardly and rearwardly extending por-

tion and vertical struts, and members extending forwardly from said horizontal portions constituting the tines of the fork, a transverse member connecting the tines, 5 transverse members connecting the parallel members at the upper ends of the vertical struts, at the outer ends of the downwardly and rearwardly extending portions, and at the junction of its portions, truss members 10 connecting the three first mentioned transverse members and transverse bracing between the parallel members and the inner ends of the tines, said bracing including a central ring member, diagonally extending 15 rods provided at one end with eyes to embrace the transverse members and connected at their other ends with the central ring member, and tubular spreader members.

23. In an apparatus of the character described, a supporting base, upwardly extending supports at one end of the base, a vertically movable track, a load handling device supported for travel upon the track, a fluid motor to actuate the track, a fluid motor 25 to actuate the load handling device, conduits for the actuating fluid for the motors extending from the motors to one end of the base and upwardly along the supports at one end

of the base, and controlling valves for said conduits. 30

24. In an apparatus of the class described, a supporting base, upwardly extending channel members at one end of the base, a movable track, a load handling device supported for travel upon the track, fluid motor actuating means for the track and load handling device, conduits for the actuating fluid for the motor means extending to one end of the base and upwardly within the channel members at one end of the base and controlling 40 means for said conduits.

25. In an apparatus of the class described, a supporting base, a movable track, a load handling device supported for travel upon the track, fluid motor actuating means for 45 the track and load handling device, conduits for the actuating fluid for the motor means and controlling valves for the conduits arranged at the rear of the apparatus.

In testimony whereof I affix my signature 50 in presence of two witnesses.

CHARLES NELSON HOOPER.

Witnesses:

A. D. KORFHAGE,
A. G. THOMAS.