

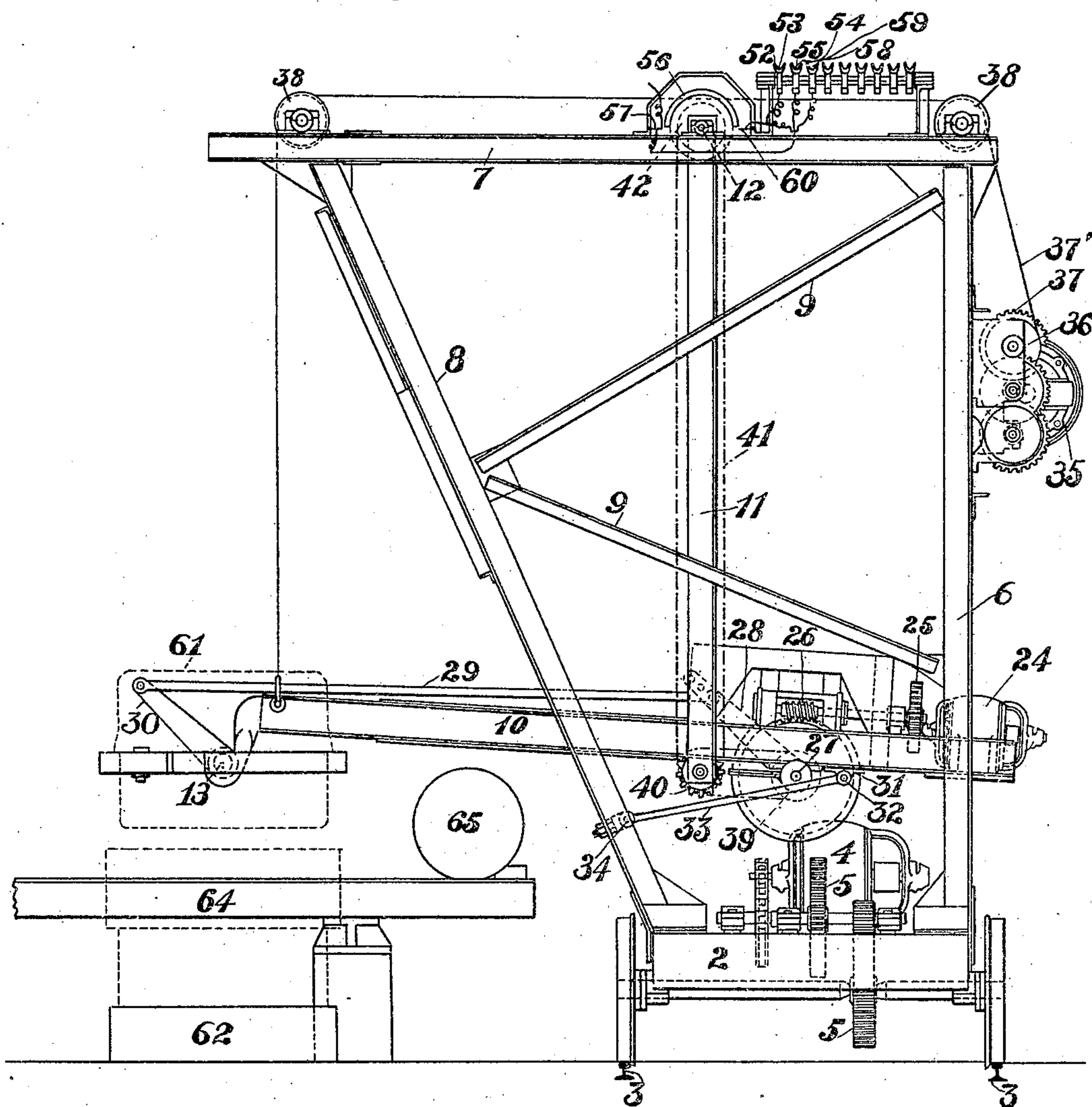
J. W. CRUIKSHANK.
GLASS TEEMING APPARATUS.
APPLICATION FILED SEPT. 8, 1908.

956,297.

Patented Apr. 26, 1910.

4 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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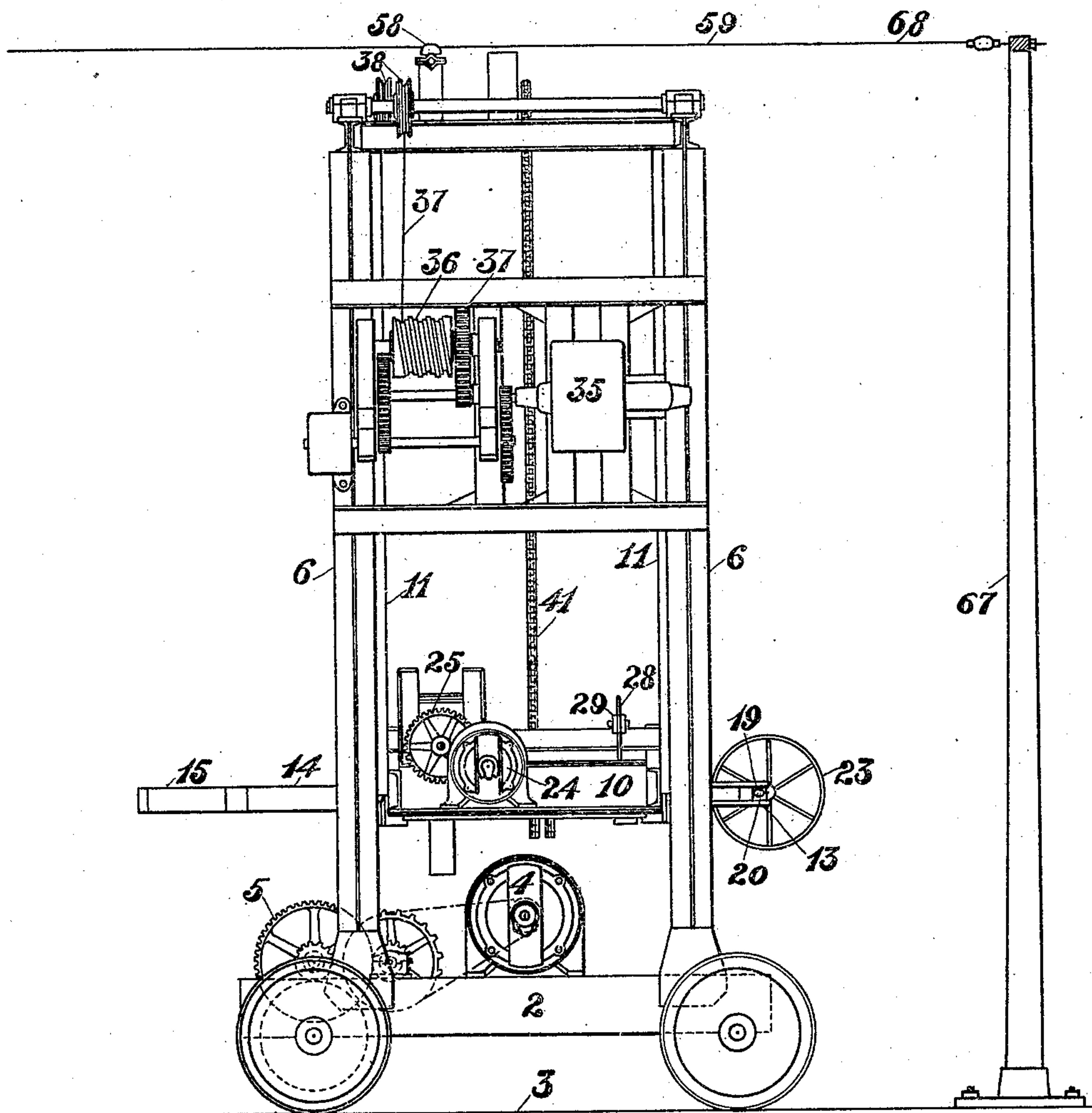
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4 SHEETS—SHEET 2.

Fig. 2.



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4 SHEETS—SHEET 3.

Fig. 5.

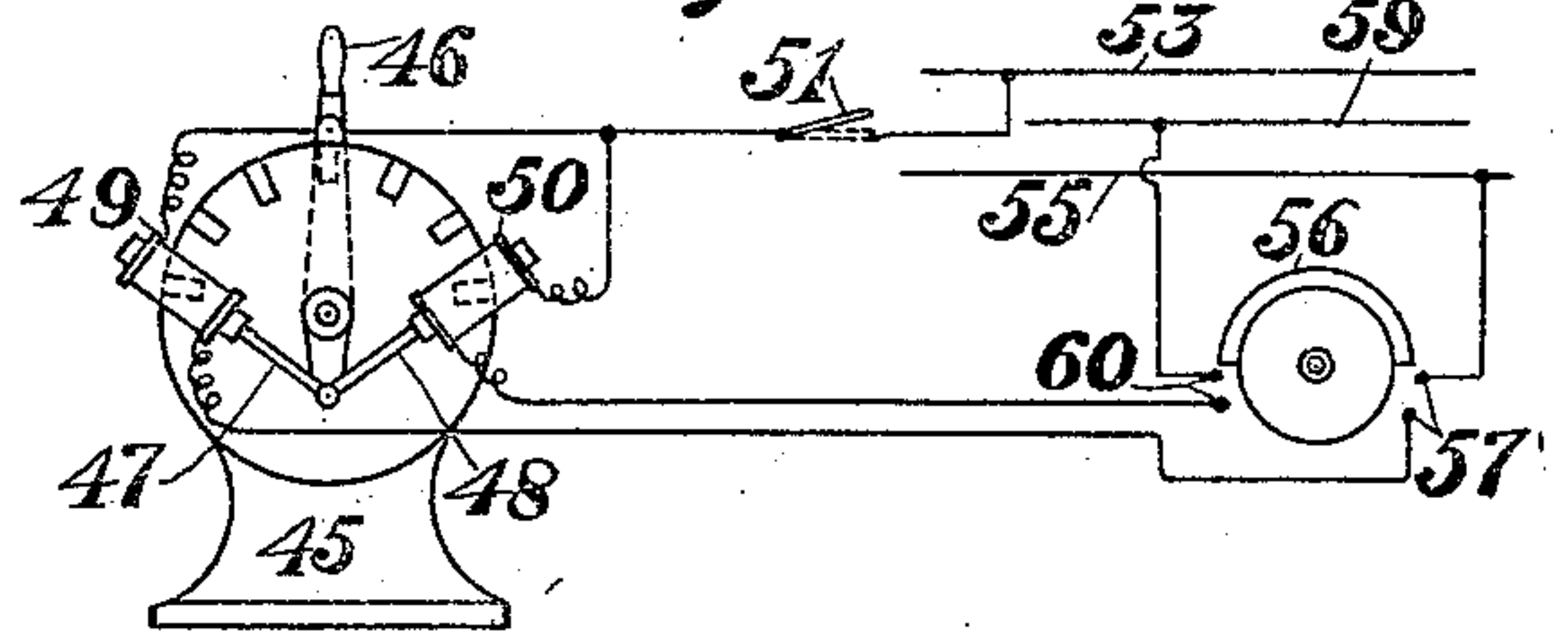


Fig. 3.

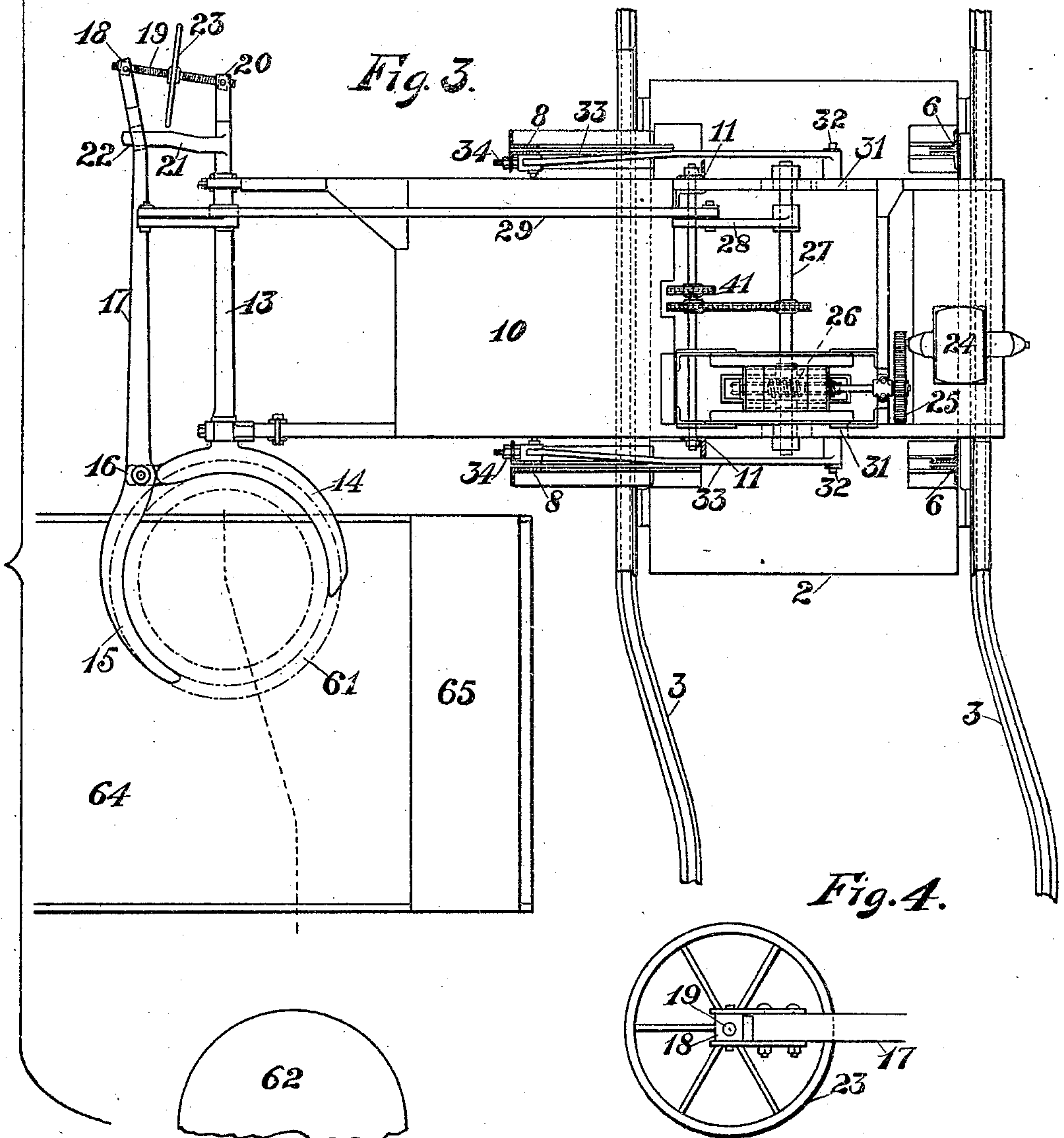
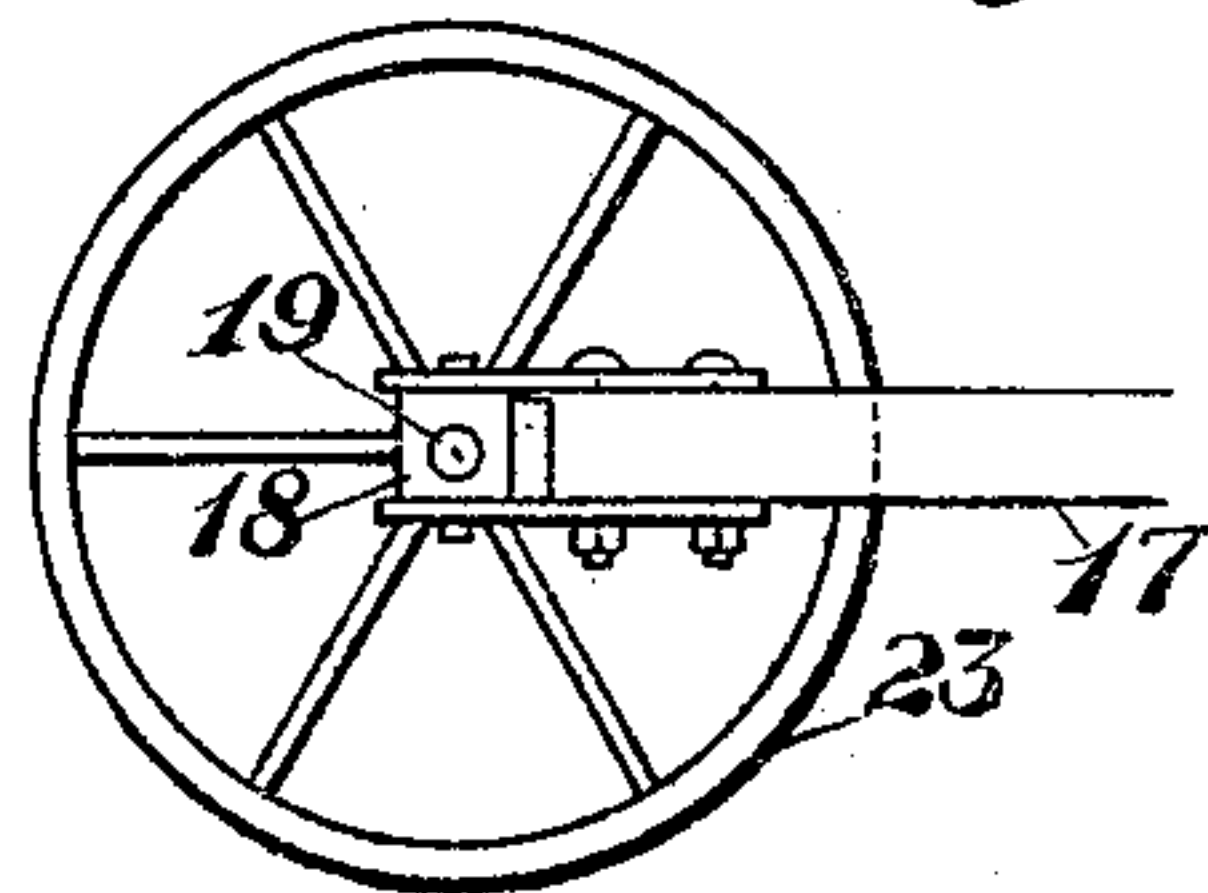


Fig. 4.



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4 SHEETS—SHEET 4.

Fig. 6.

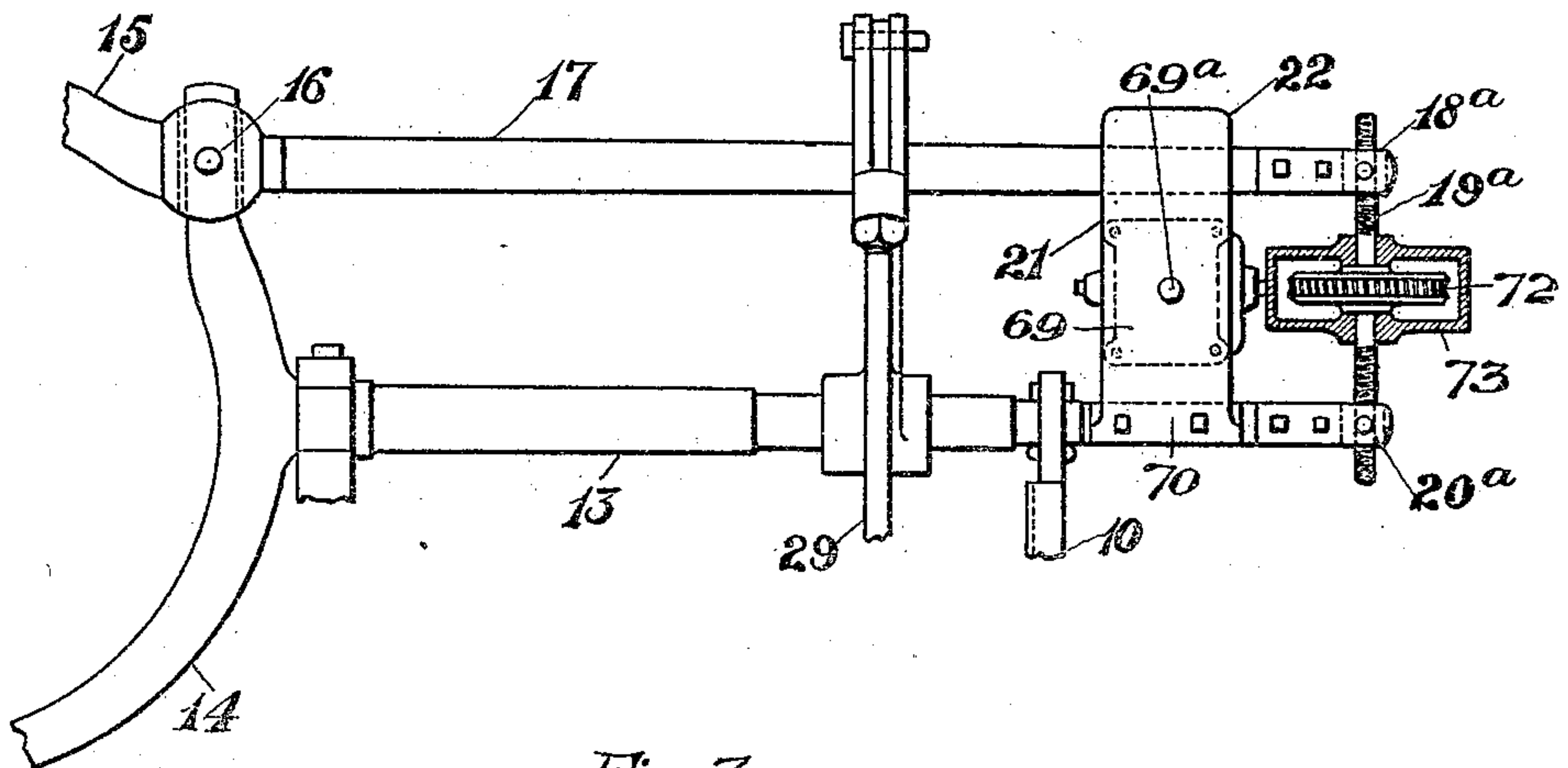
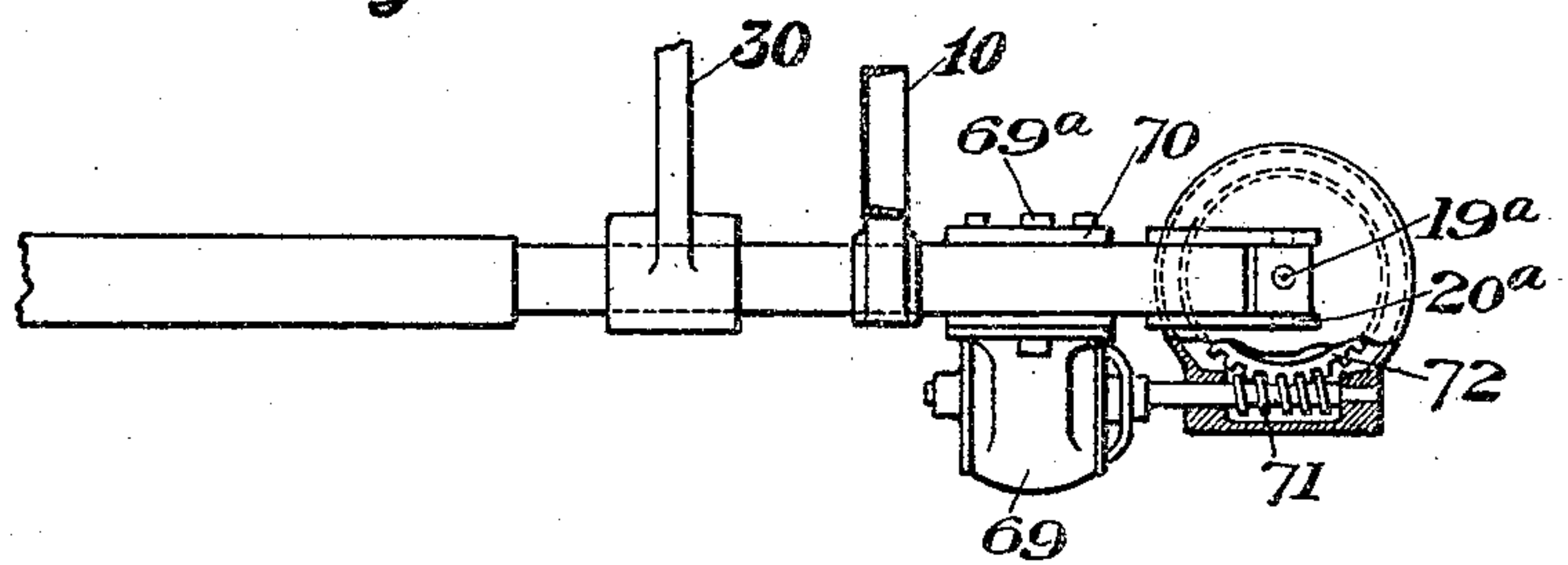


Fig. 7.



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UNITED STATES PATENT OFFICE.

JAMES W. CRUIKSHANK, OF PITTSBURG, PENNSYLVANIA.

GLASS-TEEMING APPARATUS.

956,297.

Specification of Letters Patent.

Patented Apr. 26, 1910.

Application filed September 8, 1908. Serial No. 451,984.

To all whom it may concern:

Be it known that I, JAMES W. CRUIKSHANK, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Glass-Teeming Apparatus, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation of one form of my improved apparatus, partially diagrammatic and showing the apparatus in position above a table for rolling plate glass; Fig. 2 is an end view of the same; Fig. 3 is a section on the line III—III of Fig. 2; Fig. 4 is a detail view; and Fig. 5 is a diagrammatic view showing the circuits for the automatic controller; Figs. 6 and 7 are detail views partly in section, showing power means for operating the tongs.

My invention relates to the teeming of glass from pots upon the table where the glass is to be rolled into sheets or plates, and is designed to provide improved power-actuated mechanism of this character.

A more particular object is to provide apparatus of this character by means of which a proper distribution of the glass upon the table may be obtained.

A further particular object is to provide means whereby the pot-carrying tongs may at all times be kept in a level position in taking up and clamping the pot.

A further object of the invention is to provide an improved tongs which will grip the pot from one side only.

The precise nature of my invention will be best understood by reference to the accompanying drawings, in which I have shown one form of my improved apparatus, and which will now be described, it being premised, however, that various changes may be made therein by those skilled in the art, without departing from the spirit and scope of my invention, as defined in the appended claims.

In these drawings, the numeral 2 designates a car which is movable upon a track 3, upon which it is propelled by an electric motor 4 through the reduction gearing 5, or by any other suitable propelling means. Mounted upon this car is a framework

which is shown as consisting of the vertical posts 6, top beams 7, inclined brace beams 8 and interior bracing 9. The precise construction of this frame is, however, immaterial to my invention, so long as it is of the proper character and strength to support the operative parts hereinafter described.

10 designates a frame which is suspended within the frame just described by means of the links or pendulum bars 11, which are pivoted at their upper ends at 12 to suitable bearings carried by the top beams 7. Journaled in the forwardly projecting end of the frame 10 is a tongs shaft 13, carrying the tong member 14.

15 is the cooperating tong member which is pivoted to the member 14 at 16, and which has a horizontally extending arm 17, whose upper end portion is connected to a nut 18, on the screw shaft 19, which has a bearing in the end of the tongs shaft 13, as shown at 20. The shaft 13 has an arm 21, which loosely engages the arm 17 at 22.

23 is a hand wheel on the screw shaft 19 by means of which the tong member 15 may be opened and closed.

24 is an electric motor which is mounted on the rear end portion of the frame 10, and which is connected by spur gearing 25 and worm gearing 26 with a transverse shaft 27, journaled on the under side of the frame 10. Secured to this shaft is an arm or crank 28, to which is adjustably connected one end of a link 29, whose opposite end is connected to a crank arm 30 of the tongs shaft 13. On the frame 10 are bearings 31, having pins 32, to which are connected one end of the pitmen 33, the other ends of these pitmen being adjustably connected at 34 to the lower end portions of the brace members 8.

35 is an electric motor which is suitably supported, preferably on the vertical posts or members 6 of the frame, and which drives a hoisting drum 36, through the reduction gearing 37. Connected to the drum 36 is a rope or cable 37^a, which passes over the idlers 38, on the top beam 7 and which extends downwardly and is connected to the forward end of the frame 10.

Keyed to the shaft 27 is a sprocket wheel 39, which is connected by a chain with a sprocket wheel 40 on a shaft 40^a journaled in the lower end of the pendulum bars, and

about which the frame 10 tilts as a center. The wheel 40 is in turn connected by a chain 41 with a sprocket wheel 42, which is keyed to the shaft 12 upon which the upper
5 ends of the pendulum bars 11 are pivoted.

43 is a controller for the traveling motor 4.

44 is a controller for the hoisting motor 35, and 45 is a controller for the tilting
10 motor 24. The last named controller has an operating lever 46 (see Fig. 5) provided with opposite connections 47 and 48 with two solenoid coils 49 and 50. One end of each of these solenoid coils is connected
15 through a hand switch 51 with a shoe or trolley 52, mounted on the top beam 7, and engaging one of the trolley wires 53. The other terminal of the solenoid coil 49 is connected with a second shoe or trolley 54,
20 which engages a trolley wire 55, through the medium of a contact 56, keyed to the shaft 12 and adapted to engage fixed contacts 57. The other terminal of the solenoid 50 is connected through a third trolley shoe 58,
25 engaging a wire 59, through the contact 56 when engaged with relatively fixed contacts 60. These controllers are shown set on the floor, and the connecting wires are run from them to their respective motors to the top
30 of a supporting pole 67 to which one end of the wires 58, 59 and 68 are connected on a cross arm, there being sufficient wires to connect the armatures and fields of the motors and return, to the points of the several
35 controllers.

61 designates a glass pot, 62 a pedestal or support from which the pot is to be lifted by the apparatus.

64 is a table upon which the plate or sheet
40 is to be rolled, and 65 indicates the forming roller.

The operation of the device is as follows:—The tongs are lowered into engagement with the pot by the operation of the
45 motor 35, and the hoisting drum geared thereto. The pot is then raised and the crane brought to position to bring the pot to the table. The operator now operates the motor 24, thereby turning the shaft 27,
50 which turns the tongs and pours or teems the contents of the pot upon the table, at the same time the crane moves across the table to distribute the glass. After this operation, the pot is brought back to its normal position, by reversing the motor 24. Inasmuch as the shaft 27 which carries the crank arm 28 is fixed to the frame 10, it will be apparent that when said frame is lowered the crank pins 32 will travel on an
60 arc of which the points 34 where the pitmen 33 are connected to the frame 8 are the centers. This will cause the suspension links of bars 11 to be swung forwardly carrying with them the frame 10. As this frame is tilting
65 about the center of the shaft which carries the

sprocket wheel 40, the tongs shaft 13 would, except for the forward movement of the frame 10, travel in an arc of a circle struck from that center. By reason, however, of the forward movement of the frame 10,
70 the shaft 13 is constrained to move in a vertical line. At the same time by means of the solenoids and contact devices described in connection with the controller 45, it will be observed that whenever the crank arm
75 28 tends to get out of its proper angle, the shaft 12 will be rotated through the sprocket gearing described, to bring the contact 56 into engagement with either one or the other of the relatively fixed contacts
80 57 or 60, depending upon the direction of movement of the cranks 31. When engagement is made with either of these contacts, the corresponding solenoid coil 49 or 50 is energized, and the controller lever 46 is operated to start the motor in the proper direction to restore the level of the tongs. When the operator teems the pot, the hand switch
85 51 is opened.

In Figs. 6 and 7 I have shown power
90 means for operating the tongs, comprising an electric motor 69, the frame of which is rigidly secured to the tongs shaft 13 at 70, and which has a jaw portion loosely engaging the tong-arm 17. The motor is
95 swiveled to this support between the shaft 13 and arm 17 on the center 69^a. The armature shaft of the motor carries a worm 71 which meshes with a worm gear 72 secured to a double threaded shaft 19^a and inclosed
100 in a casing 73. The oppositely threaded ends of the shaft 19^a bear in the nuts 18^a and 20^a which are swiveled in the ends of the shaft 13 and arm 17. When the motor is operated, the shaft 19^a will actuate the movable tong member. The pivot at 69^a and the swiveled nuts 18^a and 20^a permit the motor and shaft 19^a to adjust themselves to the movement of the tongs.
105

It will be seen that by reason of the pitmen 33 which are connected to a relative fixed portion of the frame, that by adjusting their length, the axis of the tongs shaft 13 can be brought closer or farther from the roller as may be required in order to get the
115 right position for the pot when it is teemed. In order to compensate for the position of the pouring lip as the pot travels across the table, and that the glass should be properly distributed and so that the sheet of glass
120 formed will have square corners; I arrange that the rails 3 of the track shall run at an angle to the table when opposite the table, so that the pot during its travel and turning movement across the table is brought in
125 closer toward the roller.

The advantages of my invention result from the simplicity of the apparatus and the convenience with which it may be operated; from the means provided for insuring a
130

proper distribution of the glass upon the table, and from the means whereby the tongs are kept in a level position. Also from the provision of the tongs which grip the pot from one side only, thereby making it easier to grip and release the pot, and making the pot more accessible. The power operating means for the tongs, when used, is also a feature of advantage.

It will be obvious to those skilled in the art that various changes may be made in the construction and arrangement of the parts. Thus, any desired arrangement of the hoist may be used for raising and lowering the tongs; the connections for rotating the tongs to lift the pot may be changed; the car may be propelled on its track by other means than those shown, and the construction of the supporting frame may be widely varied without departing from my invention; for instance I may support the frame from an overhead traveling crane running on beams instead of on a track on the floor. It will also be obvious that, instead of electric motors for operating the hoist and trip, hydraulic or any other motors may be employed and the controllers may be mounted on the traveling frame instead of on the floor.

I claim:

1. In glass teeming apparatus, a tiltable tongs carrier, tongs rotatably supported thereby, and automatically controlled means for maintaining the tongs in a level position during the tilting movement of the carrier; substantially as described.

2. In glass teeming apparatus, a tiltable tongs carrier, tongs rotatably supported thereby, a shaft having connections for rotating the tongs, a motor for operating said shaft, a controller for said motor, and means whereby the movement of the tongs from their normal level position actuates the controller and effects the operation of the motor to restore the tongs to their level position; substantially as described.

3. In glass teeming apparatus, a movable car or carriage, a pivot tongs support projecting laterally from said carriage, a tongs carrier journaled on the outer end of said support, an operating motor located on the opposite end of the support and beyond the pivot therefor, and power connections between said motor and the tongs carrier; substantially as described.

4. In glass teeming apparatus, a table for receiving the molten glass, a movable car or carriage, a track obliquely disposed with relation to the table on which the carriage moves, a rotary tongs carrier supported on the carriage, power means for actuating the tongs, means to move the car or carriage transversely of the table, the obliquely disposed track imparting a longitudinal movement to the carriage to gradually move the

outer end thereof rearwardly as the same is moved transversely of the table; substantially as described.

5. In glass teeming apparatus, a tongs carrier supported on a movable truck, a track for the wheels of the truck, a table on which the glass is to be teemed, said track being at an oblique angle so that the tongs carrier will move longitudinally over the table during their transverse movement across said table; substantially as described.

6. In apparatus for teeming glass, tongs having a relatively fixed member rotatably mounted on a carrier and arranged to grip one portion of a glass pot, a laterally extending portion on the end of said member extending on each side of the axis of the fixed member, and a movable member pivoted to one end of the laterally extending portion of the fixed member, and arranged to grip the opposite side of the glass pot; substantially as described.

7. In apparatus for teeming glass, tongs having a relatively fixed member secured to the end of a shaft and arranged to grip one portion of a glass pot, a support in which said shaft is rotatably mounted, an extension on the end of said fixed member, a relatively movable member pivoted to said extension and having an arm substantially parallel with the shaft of the fixed member, and means to move the arm away from the shaft to move the movable member of the tongs toward the fixed member; substantially as described.

8. In glass teeming apparatus, a tongs support, a shaft rotatably mounted on said support, a relatively fixed tongs member on the end of said shaft, an extension on said fixed member, a relatively movable tongs member pivoted to the extension and having a handle extending substantially parallel with the shaft, and means to move the handle with relation to the shaft to grip and release the pot; substantially as described.

9. In glass teeming apparatus, a swinging frame having a tongs member supported thereon and arranged to grip the pot of glass, a cooperating clamping device to secure the pot therein, power operating connections for turning the tongs and gripping the device, mechanism for raising and lowering the tongs to adjust the height of the pot, and automatically controlled means for maintaining the pot in a level position during the raising and lowering of the pot; substantially as described.

10. In glass teeming apparatus, a swinging support, a tilting tongs carrier mounted on said support, tongs rotatably mounted on said tongs carrier, and means to automatically swing the support when the tongs carrier is tilted, to move the tongs in a vertical line during such movement; substantially as described.

11. In glass teeming apparatus, a swinging supporting frame, a tilting tongs carrier mounted thereon, tongs rotatably mounted on said carrier, and means for maintaining the tongs in a level position during the tilting movement of the carrier; substantially as described.
12. In glass teeming apparatus, a swinging frame, a tilting tongs carrier mounted to swing with said frame, and also to have a tilting movement thereon, means for tilting the carrier, rotary tongs mounted on said carrier, and means for maintaining the tongs in a level position during the tilting movement of the carrier; substantially as described.
13. In glass teeming apparatus, a movable car or carriage a swinging frame carried thereby, a tilting tongs carrier mounted in said frame to swing therewith and also to tilt in said frame, rotary tongs mounted on said carrier, and means for giving the carrier an endwise movement during the teeming operation; substantially as described.
14. In glass teeming apparatus, a supporting frame, a swinging frame mounted thereon, a tilting tongs carrier carried by said swinging frame, tongs rotatably supported thereby, a shaft journaled on said carrier and having an operating connection with the tongs, and connections between the carrier and the relatively fixed portion of the supporting frame; substantially as described.
15. In glass teeming apparatus, a swinging frame, a longitudinally moving tongs carrier carried by said frame, tongs rotatably supported thereby, a shaft journaled on said carrier and having an operating connection with the tongs, crank pins on the tongs carrier and pitmen connecting the crank pins with a relatively fixed portion of the frame; substantially as described.
16. In a glass teeming apparatus, a swinging frame, a tilting tongs carrier mounted thereon, means for tilting the same to raise and lower the tongs, means for swinging the frame to impart a longitudinal movement to said carrier, and tongs rotatably mounted on the end of the carrier; substantially as described.
17. In glass teeming apparatus, the combination with motors for effecting the teeming and leveling of the glass pot, of controllers set at a fixed point and multiple wires connecting the resistance points of the controller to trolley wires, and trolley shoes in contact with the wires and having connections with the motors; substantially as described.
18. In glass teeming apparatus, the combination with a car or carriage, a frame carried thereby, a tilting tongs carrier carried by said frame, tongs mounted on said carrier, and tracks for the car or carriage having portions which are at an angle to the normal center line of the carriage; substantially as described.
19. In glass teeming apparatus, the combination with a car or carriage and glass teeming apparatus mounted thereon, of tracks for said car or carriage having portions thereof at an angle to the transverse axis of the glass table; substantially as described.
20. In glass teeming apparatus, a pair of tong arms pivoted to each other and arranged to clamp a glass pot between the ends of the pivoted arms, a screw shaft connecting the other ends of the arms, and power means to rotate the screw shaft to open and close the tongs; substantially as described.
21. In glass teeming apparatus, a pair of tong arms pivoted to each other and arranged to clamp a glass pot from opposite sides between the ends of the pivoted arms, a screw shaft connecting the other ends of the arms, and a motor supported on the tongs arms to rotate the screw shaft to open and close the tongs; substantially as described.
22. In glass teeming apparatus, pivoted tongs arranged to clamp a glass pot, and having a pivotal support at one side of the pot, a motor device supported by the tong arms and arranged to open and close said tongs, and means for supporting the motor to adjust itself to the different positions of the tongs in opening and closing; substantially as described.
23. In apparatus for teeming glass, tongs having a relatively fixed member, a relatively movable member pivoted to the fixed member, the members being arranged to grasp a glass pot between their ends, a screw shaft connecting the other ends of the tong members, and a motor connected to the screw shaft; substantially as described.
24. In glass teeming apparatus, a rotary shaft having a relatively fixed tongs member and a relatively movable tongs member pivoted to the fixed tongs member, a motor support carried by the tongs members, a motor swiveled to said support and an actuating connection between the motor and tongs members for opening and closing them; substantially as described.
25. In glass teeming apparatus, a rotary shaft having a relatively fixed tongs member, and a relatively movable tongs member pivoted to the fixed tongs member, a motor support fastened to one of the tongs members and having a loose engagement with the other tongs member, a motor pivoted to said support and a double screw engaging the tongs members, and actuating connections between the screw and the motor; substantially as described.
26. In glass teeming apparatus, a rotary

tongs carrier, a swinging support therefor, a motor and connections for rotating the support, said motor and connections being arranged at one side of the tongs, and power means for opening and closing the tongs; substantially as described.

27. In a glass teeming apparatus, a tongs carrier mounted for vertical and endwise movement, and actuating connections for the carrier, whereby its endwise movement is controlled by its vertical movement; substantially as described.

28. In a glass teeming apparatus, a swinging tongs carrier, a swinging frame to support the tongs carrier, means to swing the tongs carrier to raise or lower the tongs, and means controlled by the movement of the tongs carrier to swing the supporting frame so that the tongs will travel in a vertical plane; substantially as described.

29. In a glass teeming apparatus, a longitudinally swinging supporting frame, a vertically swinging tongs carrier mounted on the supporting frame, means for swinging the tongs carrier to raise or lower the tongs, and link connections to cause the tongs to move in approximately a vertical line during the swinging movement of the carrier; substantially as described.

30. In glass teeming apparatus, an oscillating tongs carrier, tongs rotatably supported thereby, and means controlled by the movement of the carrier for maintaining the tongs in a level position during the oscillating movement of the carrier; substantially as described.

31. In glass teeming apparatus, a tiltable tongs carrier, tongs rotatably supported thereby, a shaft having connections for rotating the tongs, a motor for operating said shaft, a controller for said motor, and means whereby the movement of the tongs from their normal level position actuates the controller and effects the operation of the motor to restore the tongs to their level position; substantially as described.

32. In glass teeming apparatus, a tiltable tongs carrier, tongs rotatably supported thereby, a shaft journaled on the carrier, connections between the shaft and the tongs carrier for effecting a teeming movement of

the tongs, a motor for operating said shaft, a controller for the motor, a switch, gearing between the shaft and switch, arranged to be actuated by the movement of the tongs carrier, and connections whereby the operation of the switch will automatically effect the operation of the motor; substantially as described.

33. In glass teeming apparatus, a rotary tongs carrier, power means for actuating the tongs carrier, a car or carriage arranged to move the carrier transversely of the table on which the glass is to be teemed, and means for imparting a longitudinal movement to said carrier to gradually move the outer end of the same rearwardly as the carrier is moved transversely of the table; substantially as described.

34. In glass teeming apparatus, a tongs carrier, means for moving the same transversely of the table upon which the glass is to be distributed, and means for moving the carrier gradually toward the rear end of the table during its transverse traverse thereof; substantially as described.

35. In apparatus for teeming glass, tongs having a relatively fixed member and a relatively movable member, and operated to grip the glass pot from one side only; substantially as described.

36. In glass teeming apparatus, tongs arranged to clamp a glass pot and having their pivotal support at one side of the pot, and a clamping device at the same side of the pot as the tongs pivot; substantially as described.

37. In glass teeming apparatus, a rotary shaft having its support at one side only of the glass pot, and having a relatively fixed tongs member, and a relatively movable tongs member pivoted to the fixed tongs member, and means for actuating the movable member to grip and release the pot; substantially as described.

In testimony whereof, I have hereunto set my hand.

JAMES W. CRUIKSHANK.

Witnesses:

F. R. WORDSWORTH,
HARAN ENLOW.