No. 771,315. PATENTED OCT. 4, 1904.

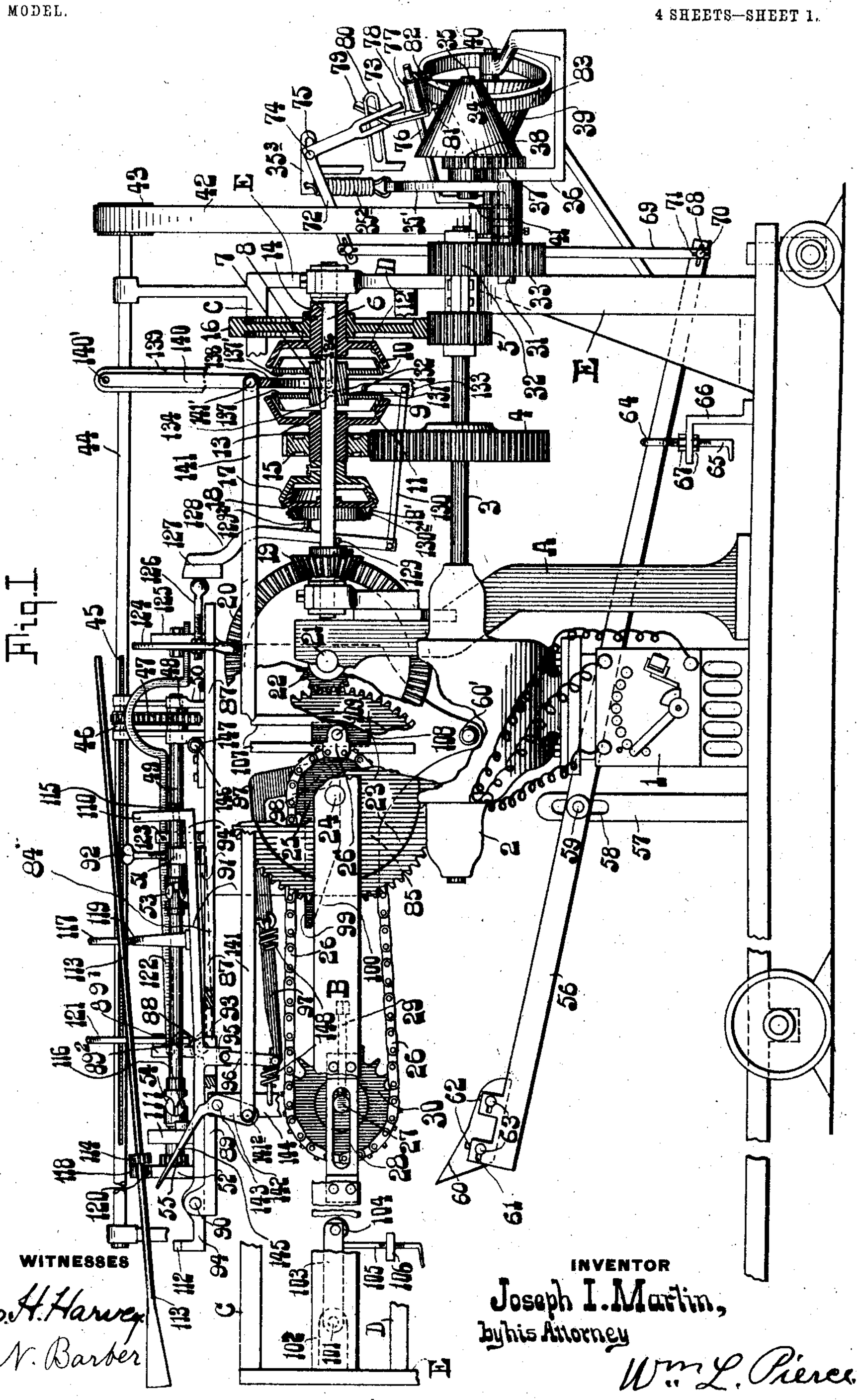
J. I. MARTIN.

GLASS GATHERING MACHINE.

APPLICATION FILED JULY 18, 1902.

NO MODEL. 4 SHEETS—SHEET 1.

Fig. 1.



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NO MODEL. 4 SHEETS—SHEET 2.

Fig. II.

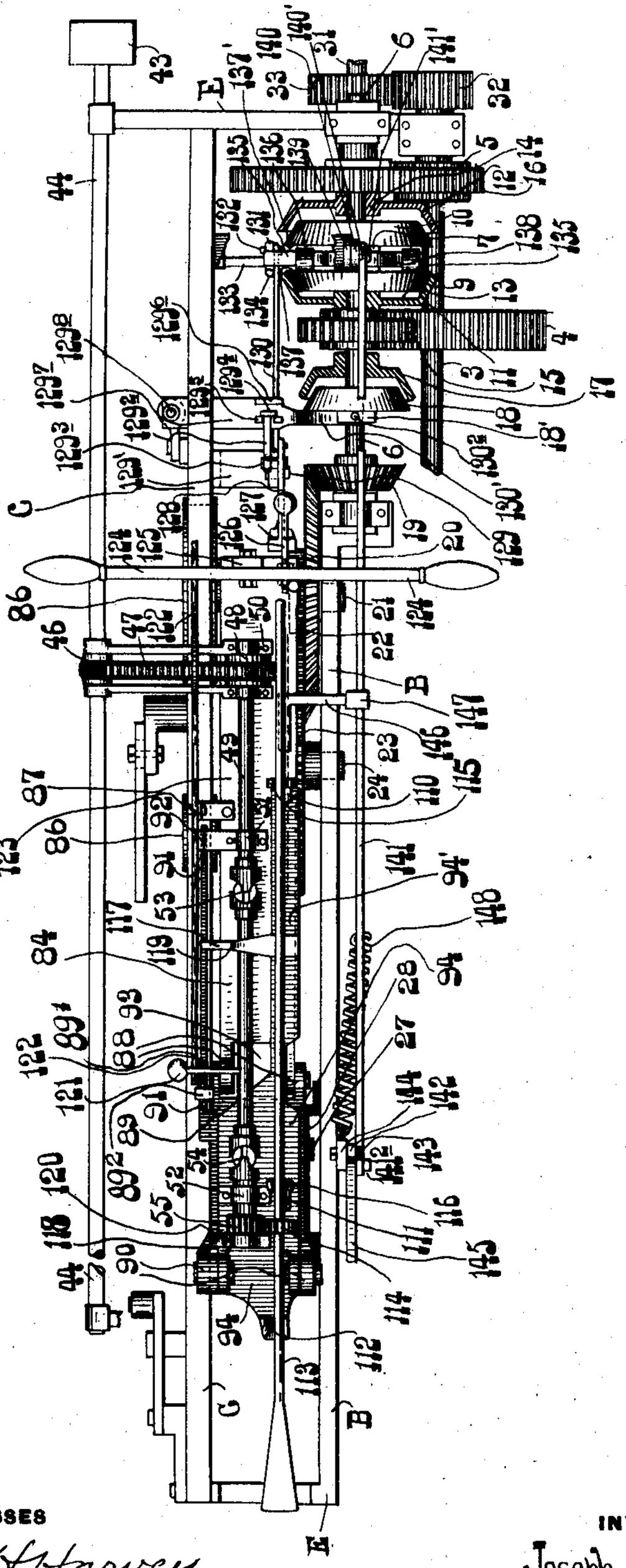

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Fig. III.

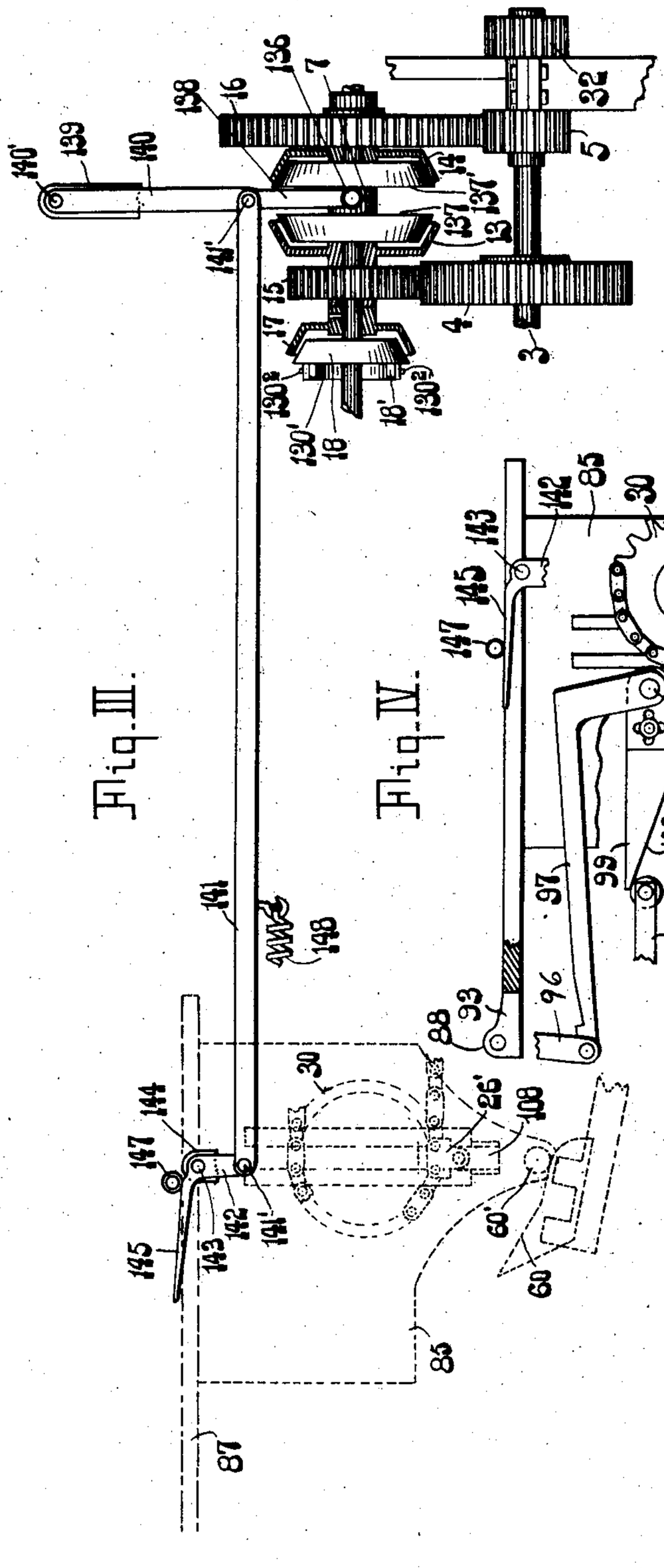
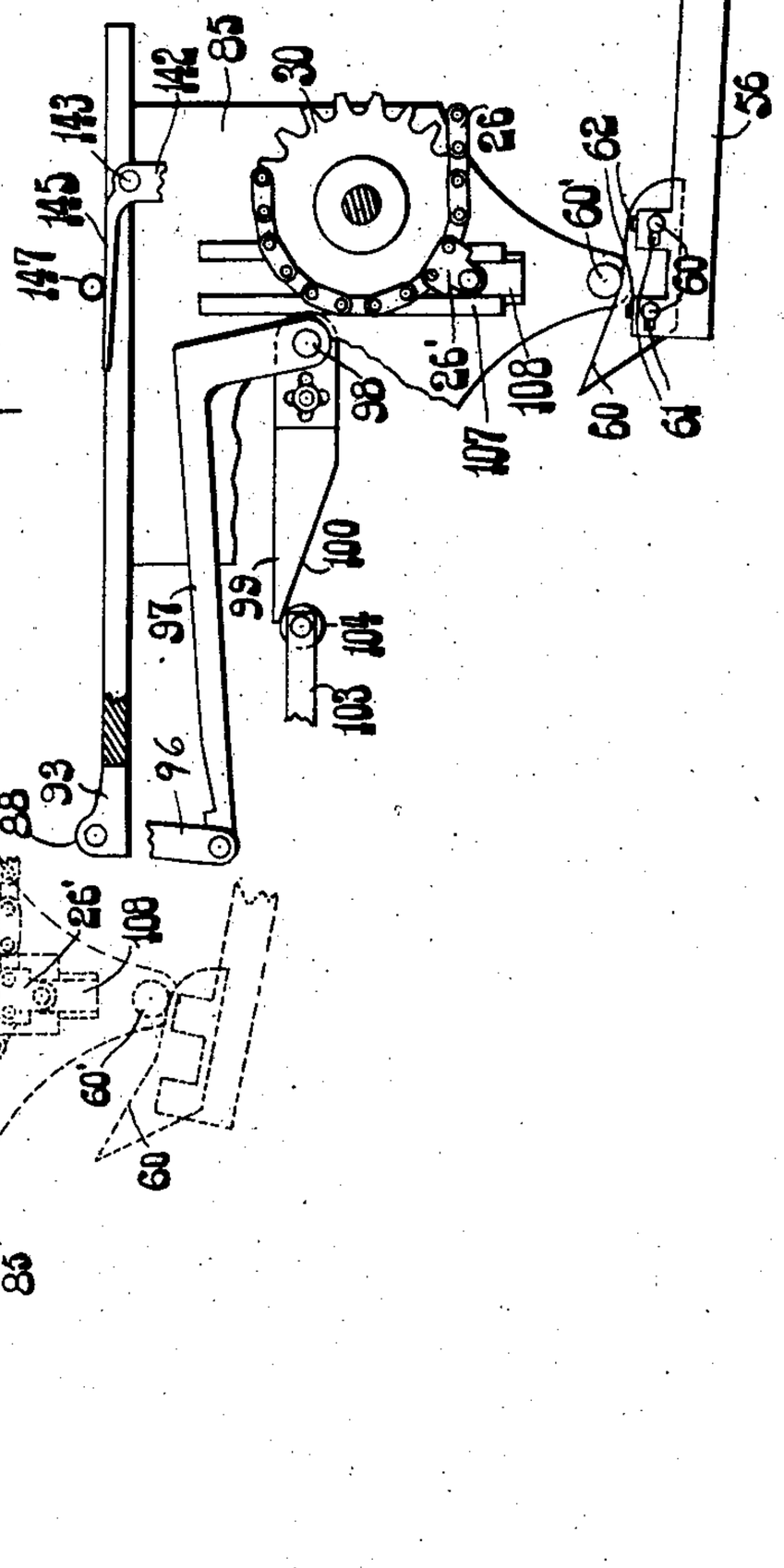


Fig. IV.



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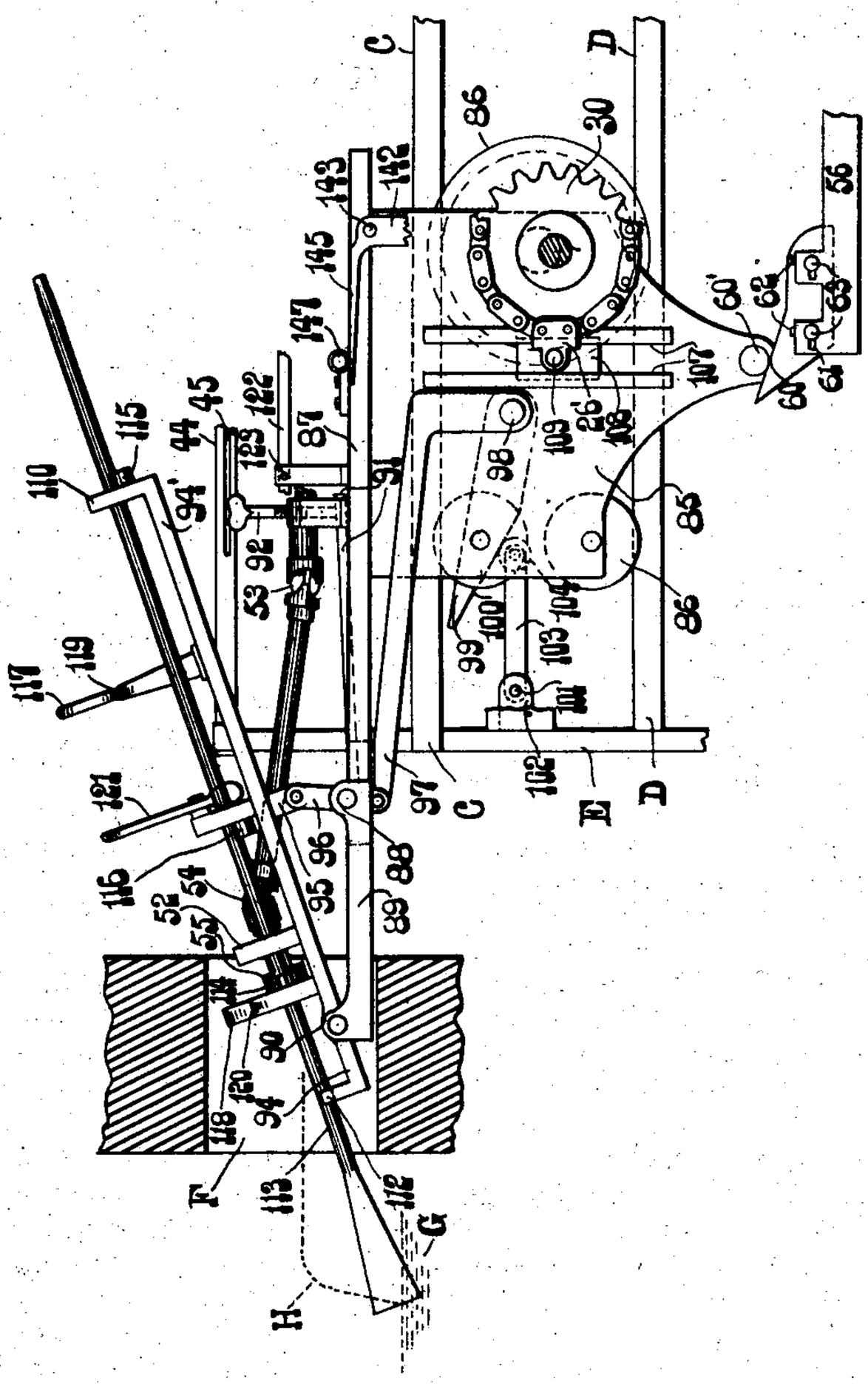
NO MODEL. 4 SHEETS—SHEET 4.

Fig. V.



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No. 771,315. Patented October 4, 1904.

UNITED STATES PATENT OFFICE.

JOSEPH I. MARTIN, OF COLUMBUS, OHIO, ASSIGNOR TO GEORGE BEATTY, OF COLUMBUS, OHIO.

GLASS-GATHERING MACHINE.

SPECIFICATION forming part of Letters Patent No. 771,315, dated October 4, 1904.

Application filed July 18, 1902. Serial No. 116,069. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH I. MARTIN, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented or discovered new and useful Improvements in Glass-Gathering Machines, of which the following is a specification.

Figure I represents in side elevation and partly broken away a view of the different parts of the machine in their relative positions previous to the start for gathering glass. It also shows the blowpipe or punty resting in the brackets above the mechanism of the machine. Fig. II represents in plan and partly in section a view of the machine and the car just about to start forward. It also shows the blowpipe or punty in position for advancing into the tank. Fig. III represents in detail the mechanism used for regulating the variable speeds of the car and the punty or blowpipe. Fig. IV represents in detail the means for raising and lowering the tilting arm which carries the blowpipe or punty. Fig. V shows the blowpipe or punty in the act of gathering glass in the tank.

The object of my invention, generally stated, is to decrease the cost of gathering glass by dispensing with skilled labor and to provide means which are both simple and positive for the gathering.

In the drawings I have shown, preferably, such means assembled and also in detail.

The machine is, as Fig. I shows, mounted on a wheeled platform or truck.

1 represents a rheostat or an electric controller connected by suitable wires to a motor 2, which drives the main shaft 3, rigidly supporting gear-wheels 4 and 5.

6 represents an auxiliary shaft having thereon a shifting clutch 7, which rotates with and slides on the shaft by means of the key 8. Clutch-faces 9 and 10 bear against corresponding inner faces 11 and 12 of idlers 13 and 14, to which are rigidly fastened gears 15 and 16, meshing into gears 4 and 5.

17 represents the rotatable part of a braking-clutch 18, said clutch 17 being fastened rigidly to the shaft 6. The clutch 18 has no rotary but has a horizontal movement for the purpose to be hereinafter described.

19 represents a bevel-gear meshing with gear 20, which is supported on shaft 21, said shaft being in turn supported on the standard A. Also supported on shaft 21 is gear 22, which is located in the rear of gear 20, as shown in Fig. I.

23 represents a gear meshing with gear 22 and supported on shaft 24, which has bearing in extension-bracket B of standard A. Located on the shaft 24 and in the rear of gear 23 is sprocket-wheel 25, which engages sprocket-chain 26. On the forward end of bracket B is located and secured thereto shaft 27, which by means of a slotted way 28 and an adjusting-screw 29 has a horizontal adjustment. Secured to said shaft 27 is an idle sprocket-wheel 30, which also engages the chain 26.

Power is transmitted from shaft 3 to shaft 31 by means of gear-wheels 32 and 33.

34 is a cone secured on shaft 35, supported by arm 35′, which surrounds shaft 31, and has a spring 35^2 secured to its upper end and to stationary arm 35^3.

36 is a supporting-bracket.

37 and 38 are gears located on shafts 31 and 35 and are the means for continuously driving the cone 34.

39 is a cone loosely mounted on shaft 40, having a pulley-wheel 41 secured to its inner portion and also loosely secured on shaft 40.

42 is a belt for transmitting power from pulley 41 to pulley 43, which is secured to one end of shaft 44, having a keyway 45.

46 represents a sprocket-wheel mounted on shaft 44 so as to have a rotary and horizontal movement, which movements are obtained by means of a key fastened to said sprocket-wheel 46 and slidable in keyway 45.

47 is a sprocket-chain engaging sprocket-wheels 46 and 48, the latter being carried by shaft 49, rotatable in bearings 50, 51, and 52, and having flexible joints 53 and 54.

55 is a gear-wheel on the forward end of shaft 49.

56 represents a rod capable of vertical ad-

justment on the upright 57, to which it is loosely secured by means of the bolt 59 in the slot 58. At the forward end of said rod is shown a runway 60, which is also capable of both a vertical and horizontal adjustment by means of the slots 61 62 and the bolts 63. Near the rear end of the rod 56 is shown a fork 64, having a lower threaded end 65 and supported on a standard 66 and adjustable by means of nuts 67. A slot 68 is shown in the rear end of said rod 56. A vertical rod 69, capable of both a horizontal and a vertical adjustment, is secured to rod 56 by means of bolts 70, passing through the slots 68 and 71. 72 is a bell-crank lever having a forked end 73 and adjustable at its fulcrum 74 by means of the slot 75 and fulcrum-bolt 74.

76 represents a stationary rod secured to the bracket-frame 36 and extending upwardly and rearwardly between the cones 34 and 39. Loosely mounted on said rod 76 is a sleeve 77, capable of movement along said rod.

78 is an upwardly-extending arm, which is bent at 79 into approximately a right angle and lies both in the fork of the end 73 of the lever 72 and in the slot of the stationary guide 80. The sleeve 77 has loosely secured on its lower side two rollers 81 and 82. An annulus 83 is secured between the faces of the cones 34 and 39 and is also guided and operated by means of the rollers 81 and 82.

84 represents the carriage composed of a vertical downwardly-extending flange 85, having grooved wheels 86 secured thereto and traveling on rails C and D of the stationary frame E. (Best shown in Fig. 5.) The bed of the carriage 84 is composed of a flat horizontal plate 87, preferably made integrally with the vertical portion 85. The forward end of said plate terminates in a hinge-joint 88, to which is secured an auxiliary bed-plate 89, also terminating in a hinged joint 90. Bed-plate 89 has a rearwardly-extending arm 91 and is capable of being adjusted vertically by means of screw 92, which passes through an extended portion of the bearing 51 and presses on the end of arm 91 to obtain the adjustment. (See Figs. II and V.)

A slot 93 is shown in Figs. I and II between the ears of the hinged joint 88. A nose-plate 94, having a rearwardly-extending arm 94′, is hinged at 90 to auxiliary plate 89 and is capable of a vertical swinging movement by means of the lug 95, which is a part of said plate, and extends downwardly through the slot 93 and has loosely connected to its end a link 96. Said link is hinged to lever 97, supported on one end of rock-shaft 98, which is mounted in stationary bearings passing through the flanges 85 of carriage 84. Rigidly secured at the other end of rock-shaft 98 is an arm 99, having an incline 100. Supported by a hinge-joint 101 to an extension-arm 102 of the frame E is a rod 103, having a roller 104 and capable of vertical adjustment by means of a screw 105, rotatably secured in stationary projection 106 and bearing against the bottom of said rod 103.

The bearing 52 and gear-wheel 55 are located on nose-plate 94, as also are the guides 110 and 111 and the slotted rest 112, which hold the bowpipe or punty 113 in alinement while the machine is in operation. Gear 114 is secured to the blowpipe or punty, and when the pipe is in position between the small rollers 115 and 116 the gear 114 is meshed into gear 55 of the nose-plate 94.

117 and 118 represent holders on the nose-plate, having grooves 119 and 120, in which the blowpipe or punty is placed previous to starting the car forward.

121 represents an overbalanced lever secured to pin 89′ on lug 89^2 on the bed-plate 89 and is operated by long lever 122, secured to a standard on the plate 87 at its fulcrum 123. The rear end of lever 122 is free to be acted upon by the lever-arm 124, while its front end is located so as to act on the lower arm of lever 121.

Lever-arm 124 is pivotally secured to an upright 125 at the rear end of the plate 87. Adjustably secured at one side of the fulcrum of the lever-arm 124 is pin 126, which engages the face 127 of lever 128, pivotally secured at 129 to an extension-piece 129′, which is bolted to rails C and D.

129^2 is a pin pivotally secured to lever 128 by means of a transverse pivot 129^3. The other end of said pin has a head 129^4, which moves horizontally between the slotted flange 129^5 and the back flange 129^6 of the arm 129^7, pivoted at 129^8 and extending toward the shaft 6 into yoke 130′. The yoke 130′ has two vertical pins 130^2, which engage projections 18′ on the braking-clutch 18.

130 is a rod connecting lever 128 and lever 131, the latter pivotally connected at 132 to a stationary support 133, secured to the frame of the machine. The upper end 134 of lever 131 engages the side of one of the horizontal pins 135, which are provided with rollers 136, engaging the inner faces 137 and 137′ of the shifting clutch 7. The pins 135 are secured to the yoke 138, which extends in half-circular form around the upper portion of the neck of the shifting clutch 7, and has an arm 140 pivotally secured at 140′ to and near the top of the standard 139. A rod 141 is pivotally secured to arm 140 of the yoke 138 at 141′ and extends forward to a pin 141^2, which loosely secures it to the lower end of lever 142. Lever 142 is pivotally connected at 143 to standard 144, which is secured to extension B of standard A. The upper end 145 of lever 142 is of a springy nature. A coil-spring 148 is secured to the standard 144 and rod 141.

A laterally-extending arm 146, carrying a roller 147, is secured to the horizontal bed-plate 87 and operates the lever-rod 142 in the forward movement of the carriage 84.

The flange 85 of carriage 84 has a vertical slideway 107, in which moves a slide-block 108, having secured thereto a pin 109, loosely engaged in an eye in an extended portion 26′ of the sprocket-chain 26. The lower end of said flange 85 terminates in an arm to which a roller 60′ is secured.

Before starting the machine the blowpipe or punty 113 is placed in the grooves 119 and 120 of the holders 117 and 118, which are located on the nose-plate 94 and its extended arm 94′. In the operation of my machine the desired amount of electrical energy required passes through the rheostat 1 and supplies the motor 2. While I have indicated and shown electric appliances for the motive power, still I do not confine myself to that means, as any of the well-known means of running machinery can be used without departing from my invention.

It is to be understood that preferably the motor 2, main shaft 3, and the gears 4, 5, and 32 thereon run continuously, as also do the gears 15 and 16, secured to the idlers 13 and 14 on auxiliary shaft 6, and also the gears 33 and 37 on shaft 31, the gear 38, and cones 34 and 39.

In starting the carriage 84 the end of lever-arm 124 toward an observer, looking at Fig. II, is raised until its descending part presses down on the end of the long lever 122, which causes the other end thereof to move upward, overbalancing the lever 121 and causing the end of said lever 121 to strike the blowpipe or punty 113 and move it out of the grooves 119 and 120, whereupon it rolls down the inclined faces of the holders 117 and 118 until it lies between the wheels 115 and 116 of the guides 110 and 111 on the nose-plate 94 and its extended arm 94′. The gear 114 on blowpipe or punty 113 then meshes with the gear 55 on the nose-plate 94. The lever-arm 124 when raised as above described also removes the pin 126 from contact with the face 127 of lever 128, permitting the braking-clutch 18 to be drawn by spring 148 out of engagement with the rotatable portion 17 by means of the pin 129^2, which is above the pivotal connection of lever 128, pulling against the inner face of the slotted flange 129^5, thereby causing the inner end of arm 129^7 and the yoke 130′ to move forward and to pull on the pins 130^2. Said pins pull on the projections 18′, which disengage the clutch 18 from the rotatable portion 17.

During the operation set forth in the next preceding paragraph the lower end of said lever 128 moves toward the rear of the machine, and it in turn through the connecting-rod 130 causes the lower end of lever 131 to also move toward the rear of the machine, while the upper end 134 of the lever moves forward and away from the horizontal pin 135 of the yoke 138. (Best seen in Fig. II.) The moment the pin 126 disengages from the face 127 of lever 128 it causes the tension on coil-spring 148 to pull the long lever-rod 141 forward, and it in turn causes the lower end of the arm 140 and the yoke 138 to move forward, pressing the rollers 136 against the inner face 137 of shifting clutch 7, which causes clutch 7 to move forward until its outer inclined face 9 bears against the inner face 11 of the idler 13. (See Fig. II.) These three operations resulting from the actuation of starting-lever 124 are approximately simultaneous.

Power is now transmitted through gear 4 to gear 15 and idler 13 and then through clutch 7 to shaft 6, then through shaft 6 to bevel-gears 19 and 20, which latter gear turns shaft 21 and small gear 22. Gear 22 transmits power to large gear 23 on shaft 24, which drives sprocket-wheel 25, sprocket-chain 26, and the idler sprocket-wheel 30.

The transmission of power and high speed from the motor to the sprocket-chain, as above described, remains the same until the car 84 has traveled, as below described, far enough forward for the roller 147 on said carriage 84 to engage the upper end 145 of lever 142. The extended portion 26′ of the chain 26, which is secured to the sliding block 108, as shown in Fig. I, is now in the right position relatively for pushing the carriage forward, and by referring to Fig. II the proper clutch and gears may be seen for running the sprocket-chain 26.

I will now describe the forward movement of the car 84. The sprocket-chain 26 moves in one direction only, and the extended portion of the link 26′ is always in engagement with the sliding block 108, which by means of the vertical slideway 107 moves the carriage 84 forward on the wheels 86. When the car 84 moves forward to the position indicated in Fig. III, the extension-link 26′ is below and in a vertical line with the axis of the sprocket-wheel 30. The roller 147 on car 84 is in contact with the upper arm 145 of lever 142 and presses the lever-arm 145 down, thereby pushing the lower end of lever 142 toward the rear of the machine, causing lever-rod 141 to push the yoke 138 back until rollers 136 engage the inner face 137′ of the shifting clutch 7, which moves the clutch out of contact with the idler 13 and into contact with idler 14, causing small gear 5 instead of gear-wheel 4 to drive the sprocket-chain 26. As gears 5 and 15 are smaller than gears 4 and 16, it will be readily seen that when gear 5 is driving the sprocket-chain it will be moving slower than when gear 4 is driving it. As seen in Fig. IV, the carriage has moved forward about two links of the chain 26 from the position shown in Fig. III and is about to cause the arm 99 to ride up on the roller 104 and raise the rear end of the nose-plate 94 and also to cause the roller 60′ to press down on the rod 56 in order to speed up the sprocket-chain 47.

By adjusting the runway 60 by means of the slots 61 and 62 and the bolts 63 the rate at which the speed varies may be changed to suit the conditions to be met.

In connection with the important movements about to be described it will be well to state that in the machine method of gathering glass while in a molten condition the nearer the machine is adapted to imitate the old way of gathering by hand the more practical seem to be the results—as, for instance, the end of the blowpipe in this invention is inserted in the molten glass a predetermined distance while revolving and remains in the molten glass during a number of predetermined revolutions, which are governed by the size of the gathering to be made. The winding off of the thread from the gathered glass and also the withdrawal of the blowpipe from the tank are practically similar to hand gathering and its results.

In Fig. V the carriage 84 has traveled to its forward position and the auxiliary bed-plate 89 and the nose-plate 94 are shown as partly entered in the ring-hole F of the tank G. The inclined face 100 of lever-arm 99 is shown as raising the nose-plate 94 to the preferred angle to make the desired gathering. This is accomplished by means of the rock-shaft 98, to which lever-arm 99 and lever 97 are fixed, and the link 96, connecting the forward end of lever 97 and the lug 95 on nose-plate 94.

While it seems that the end of the blowpipe as it rises out of the glass would naturally trace an arc, still I have provided means whereby the blowpipe not only revolves during the gathering, but is raised, preferably, as indicated by dotted line H in Fig. V, after the gathering has been made. This I accomplish by the extension-link 26′ being in or near the horizontal plane of the axis of the sprocket-wheel while the punty or blowpipe is in the glass. Just before and shortly after the extension-link 26′ has passed that plane the end of the blowpipe has no perceptible forward or backward movement, because the travel of the said link is substantially at a right angle to the rails C and D. The inclined face 100 of the lever-arm 99 slowly rides down the wheel 104, causing the end of the blowpipe as it rises to retreat at a very small angle until the extension-link 26′ is about to pass the vertical axis of the sprocket-wheel 30, when the blowpipe describes a quick arc and while still revolving is quickly withdrawn in a horizontal position from the tank. The particular path can be determined or varied as desired to give the gatherer of glass the preferred path by properly designing the inclined or cam surface 100.

During the operation just described the roll 60′ on the lower end of the vertical flange 85 of carriage 84 presses downward on the inclined face of the runway 60, which pushes down on the forward end of lever 56, Fig. I, and raises the other end, causing rod 69 to push upward on the forward end of lever 72, while the outer or forked end 73 thereof moves downwardly and inwardly, pulling on the bent portion 79 of extended arm 78, causing the sleeve 77, surrounding stationary rod 76, to move inwardly. This causes the roller 82 to bear against the outer side of the annulus 83 and move it toward the larger diameter of cone 34 and the smaller diameter of cone 39, thereby increasing the speed of the belt 42, which, through shaft 44, sprocket-chain 47, shaft 49, gears 55 and 114, increases the speed of the revolving blowpipe previous to and during part of the gathering of the glass. As the carriage retreats all the speed-changing mechanism gradually returns by gravity to its normal position, thereby decreasing the speed gradually during the winding off of the thread.

The blowpipe 113 having gathered the desired amount of glass and the extension-link 26′ having passed around the forward end of the sprocket-wheel 30, the movement of the carriage 84 has been reversed, and it travels backward at the same speed it traveled near the end of its forward movement until the roller 147 is disengaged from the upper end 145 of lever 142, which causes the spring 148 to draw the lever-rod 141 forward, whereupon the clutch 7 is withdrawn from idler 14 and engaged with idler 13. The speed of the carriage is thereby increased on its return, and when pin 126 of lever 124 strikes against face-plate 127 of lever 128 the pin 129^2 pushes against the flange 129^6, which pushes the yoke 130′ rearward, causing pins 130^2 to push the face of the brake-clutch 18 against the revolving part 17, thereby stopping the rotation of the shaft 6.

The said movement of the lever 128 causes the upper end 134 of lever-arm 133 to bear against the rolls 136 on the horizontal pins 135 of the yoke 138 and pushes the shifting clutch 7 out of contact with the idler 13, thereby preventing shaft 3 from driving shaft 6, the various parts of the mechanism being left in the position indicated in Fig. I, which is the position in which the carriage rests before starting, as hereinbefore described. When the carriage returns to the position shown in Fig. I, the blowpipe is removed and another is placed in the holders 117 and 118, as shown in said figure.

Having described my invention, I claim—

1. In a glass-gathering machine, a gathering-tool, a carriage therefor, an endless driving means for the carriage, said driving means traveling in a uniform direction and being so timed that the carriage is practically stationary during the time the tool is in the glass.

2. In a glass-gathering machine, an adjustable bed-plate thereon, a carriage, a tilting

nose-plate carried by the bed-plate, a gathering-tool carried by the nose-plate, a rock-shaft having one arm connected to the nose-plate and a second arm adapted to be lifted, when the carriage is in the gathering position, to dip the gathering-tool into the glass.

3. In a glass-gathering machine, an adjustable bed-plate thereon, a carriage, a tilting nose-plate carried by the bed-plate, a gathering-tool carried by the nose-plate, a rock-shaft having an arm connected to the nose-plate and a second arm beveled on one side, and a fixed stop on which the beveled arm rides to cause the tool to enter and withdraw from the glass.

4. In a glass-gathering machine, a carriage for the gathering-tool, a driving-shaft, a driven shaft connected with the carriage, a pair of idlers loose on the latter shaft, each having fixed thereon a gear-wheel, one larger than the other, gear-wheels of unequal size fixed on the first-named shaft, the larger and the smaller wheels on the latter shaft gearing with the smaller and larger, respectively, on the driven shaft, a shifting clutch on the latter shaft, and means connected to the carriage and to the shifting clutch whereby, when the tool is making a gather, the driven shaft moves slower and when the gather has been completed, the driven shaft moves faster.

5. In a glass-gathering machine, a carriage adapted to travel toward and from the furnace, an auxiliary bed-plate pivoted thereto, a nose-plate pivoted to the said bed-plate and provided with a forward extension, and a gathering-tool rotatably supported on the nose-plate and said extension.

6. In a glass-gathering machine, a carriage, a rotatable gathering-tool carried thereon, mechanism for driving the gathering-tool at variable speeds, and means for adjusting the rate of varying the speed of said tool.

7. In a glass-gathering machine, a carriage, a rotatable gathering-tool carried thereon, a variable-speed mechanism for rotating the tool, mechanism provided with an adjustable shoe for coöperation with the carriage, whereby the rate of varying the speed of the tool may be changed.

Signed at Columbus, Ohio, this 12th day of July, 1902.

JOSEPH I. MARTIN.

Witnesses:

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