Nov. 18, 1924. 1,515,793

A. J. SANFORD ET AL

MACHINE FOR FINISHING GLASSWARE

Filed March 27, 1922 3 Sheets-Sheet 1

FIG. 1

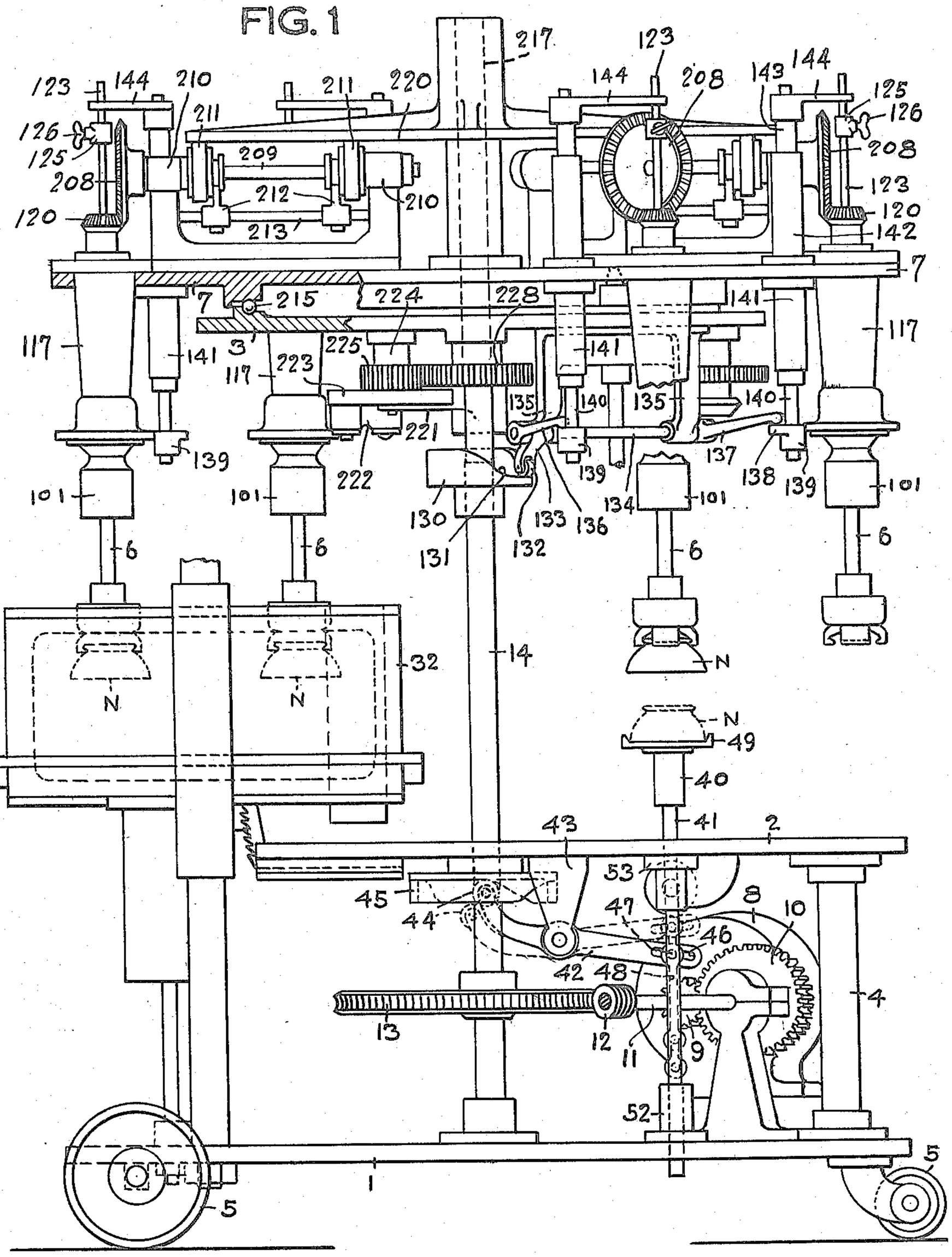

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FIG. 2

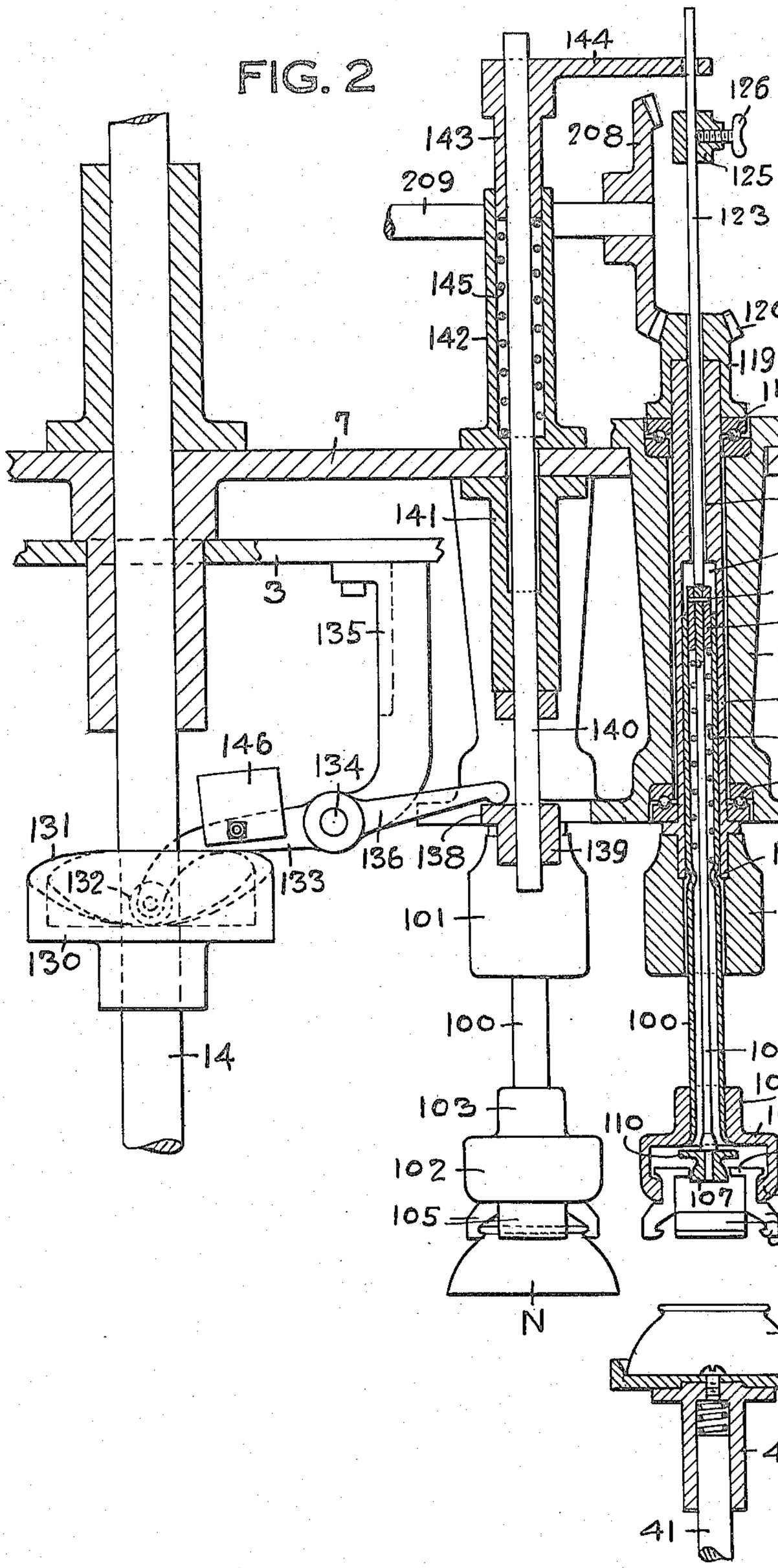

FIG. 3

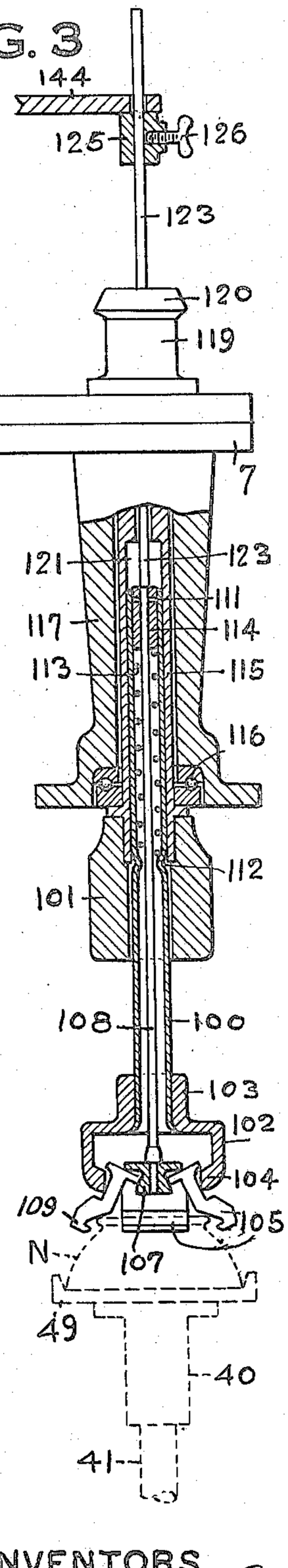

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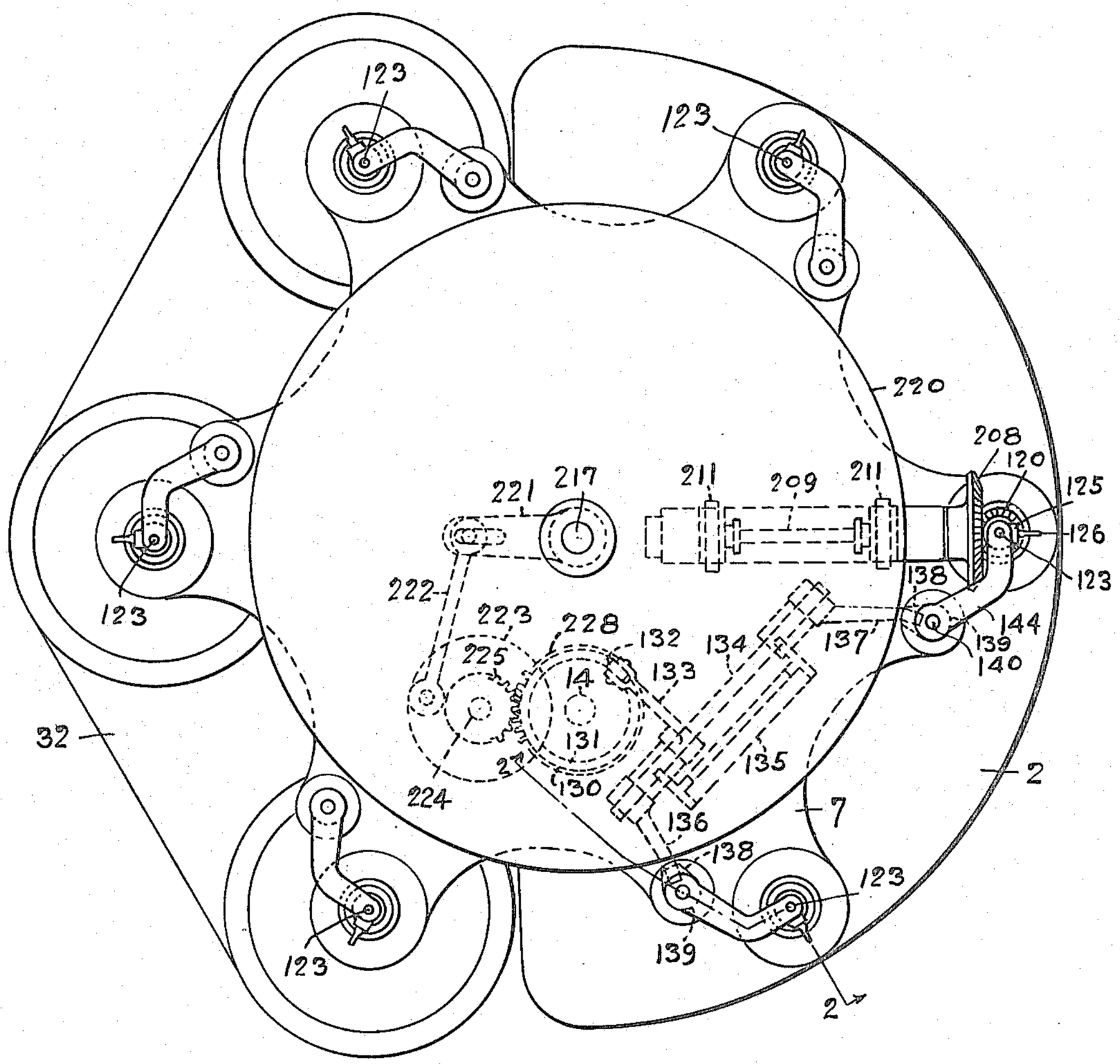
FIG. 4



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UNITED STATES PATENT OFFICE.

ANDREW J. SANFORD AND JOHN B. TOWNSEND, OF NEWARK, OHIO, ASSIGNORS TO A. H. HEISEY & CO., OF NEWARK, OHIO, A COPARTNERSHIP.

MACHINE FOR FINISHING GLASSWARE.

Application filed March 27, 1922. Serial No. 547,227.

To all whom it may concern:

Be it known that we, ANDREW J. SANFORD and JOHN B. TOWNSEND, citizens of the United States, and residents of Newark, in the county of Licking and State of Ohio, have invented a new and useful Improvement in Machines for Finishing Glassware; and we do hereby declare the following to be a full, clear, and exact description thereof.

Our invention relates to glass finishing machines having snap devices for holding the glassware during the fire-polishing and finishing operations, and its object is to provide an automatic finishing machine having a simple and effective snap which shall operate automatically to receive the ware to be finished, to carry the ware through the finishing operations, and finally to discharge the finished ware.

Our copending application for Letters Patent filed August 30, 1921, Serial No. 496,884, describes and claims a machine for receiving tumblers, nappies and other hollow glassware, carrying the ware to a series of fire-polishing glory holes, with exposure to the air between the fire-polishing operations, then finishing and burnishing the fire-polished ware, and finally discharging the finished ware. The said copending application shows, as its specific means for holding and conveying the ware, a form of device in which the ware is "stuck up" upon the lower surfaces of ware holding punties and is attached to the punties by the adhesion of the soft glass. Our present invention is designed to provide a machine of the same character as that of the said copending application, and having a snapping-up device for holding and conveying the ware. It will be understood, however, that certain features of our present device may be employed with other forms of machines for handling glassware.

In the accompanying drawings, Fig. 1 is a side elevational view showing so much of a fire-polishing and finishing machine as is necessary to an understanding of the present invention; Fig. 2 is a vertical sectional view showing the construction of the snap device, the section being taken substantially along the line 2—2, Fig. 4; Fig. 3 is a side view, partly in elevation and partly in section, showing one of the snap devices in its open position; and Fig. 4 is a plan view of the entire machine.

Figs. 1 and 4 show a machine which consists of a rotary carrier that rotates in a step-by-step manner and carries a series of six vertical punty devices, each of which is provided with a snap device for grasping and holding the glassware. The carrier is caused to advance one-sixth of a revolution at each step. At the first position the ware is snapped up and attached to the punty; at the second position it enters the first glory hole; at the third and fourth positions it enters the second and third glory holes; at the fifth position it is finished; and at the sixth position it is released from the snap.

The frame of the machine consists of a base plate 1, a center plate 2, and a top plate 3, the center and top plates being separated from the base plate by means of columns 4 which are mainly omitted from the drawing for the sake of clearness. The entire machine may be carried on suitable wheels 5.

For the purpose of conveying the ware to the several operating positions successively, a set of six snap devices, indicated generally by the numeral 6, is suspended from a plate 7 which is given a step-by-step rotation.

Power for operating the machine is derived from a motor 8, the shaft of which carries a pinion 9 meshing with a gear 10 on a countershaft 11 to which is secured a worm 12 meshing with a worm wheel 13 on a vertical power shaft 14. The base plate 1 also carries gearing for raising and lowering a glory hole furnace 32, but as this mechanism is not necessary for a description of my present invention it is omitted from the drawing.

For the purpose of bringing the ware into position to be received by the snaps, we provide a device which is similar to that shown in our above-mentioned application, and which consists of a head 40 carried at the upper end of a rod 41 which extends through a fixed bearing 52 on the base plate 1, and through a laterally adjustable bearing 53 in the center plate 2. For the purpose of raising and lowering the rod 41 a lever 42 is pivoted on a bracket 43 secured to the under side of the center plate 2. One end of the lever 42 carries a cam roller 44 which engages a cam 45 secured to the vertical power

shaft 14. The other end of the lever 42 is slotted at 46 to receive a pin 47 carried at the upper end of a vertical link 48, the lower end of which is adjustably connected to the rod 41. The head 40 carries a flanged plate 49 on which is shown a nappy N in position to be raised into engagement with the snap.

Before proceeding to a detailed description of the snap device, it may be stated that all of these devices are given an intermittent rotation in the glory hole and finishing positions by means of bevel gear wheels 208 on horizontal shafts 209 which are secured in bearings 210 on the rotating plate 7 which rests on ball bearings 215 in a suitable ball race on the stationary plate 3. Each shaft 209 carries two friction wheels 211 which are feathered on the shaft 209 and may be adjusted lengthwise of this shaft by means of forks 212 carried by a rod 213 that extends through the bearings 210. A friction wheel 220 is keyed to a central shaft 217 which is oscillated back and forth by means of a lever 221 which has one end secured to the oscillating central shaft 217 while its other end is attached by a pin and slot connection to one end of a pitman 222. The other end of the pitman 222 is pivoted on the under side of a crank wheel 223 mounted on a pin 224 which hangs from the under side of the stationary top plate 3. A gear 225 is formed integral with or secured to the crank wheel 223, and meshes with a gear 228 on the main vertical power shaft 14.

The parts thus far described are similar to those described in our said prior application, and it is believed that they are sufficient to show the general manner in which the ware is handled. For convenient reference, we have employed the same reference numerals as in the said application to indicate the various parts referred to above.

Proceeding now to a description of the snap device, and with particular reference to Figures 2 and 3, each of these devices consists of a tubular punty 100 which is secured in a chuck 101 of ordinary construction and carries at its lower end a snap consisting of a hollow circular head 102 having a collar 103 which is rigidly attached to the lower end of the punty tube 100, and having an inner flange 104 formed around its lower open end. Three or more movable gripping fingers 105 are suspended from the flange 104 and are provided with projections 106 which are received in a circular recess formed around the lower end 107 of an operating rod 108. The fingers 105 have ware-holding hooks 109 at their lower ends and are loose in the member 102, being prevented from falling out by engagement of their projections 106 with the rod 108 and the flange 104. The rod 108 also carries a circular flange 110 above its flaring lower end 107. By the construction just described the rod 108, when moved lengthwise in the tube 100, operates the ware-holding fingers 105. When the rod 108 is raised, as shown in Fig. 2, the lower projection 107 engages the projections 106 of the fingers 105 and forces them all into their ware-holding position. When, however, the rod 108 is moved down in the tube 100 the flange 110 depresses the projections 106 of the fingers 105 and thereby moves the fingers to their inclined position shown in Fig. 3.

The punty tube 100 has a reduced portion 112 which serves as a seat for the lower end of a spring 113 which surrounds the rod 108 and is confined between the seat 112 and the lower end of a sleeve 114 which is attached to the upper end of the rod 108 by means of a pin or rivet 111. The chuck 101 is secured to the lower end of a hollow shaft 115 mounted in ball bearings 116 in a support 117 which is suspended in an opening in the plate 7 by means of a circular flange 118. A sleeve 119 is keyed to the upper end of the hollow shaft 115 and carries a bevel pinion 120 meshing with the bevel gear 208 on the shaft 209 as described above. The hollow shaft 115 contains an opening 121 of relatively large diameter for receiving the upper end of the tube 100, and also contains an opening 122 of less diameter through which extends a rod 123 which rests upon the upper end of the operating rod 108. The rod 123 carries a striking block 125 which is adjustably secured to the rod 123 by means of a set screw 126.

It will be observed that if the rod 123 is depressed it will force down the operating rod 108 and will compress the spring 113, and that the downward movement of the rod 108 will open the snap as described above. Also, it will be seen that when pressure on the rod 123 is released the spring 113 will return the rods 108 and 123 to their upper position as in Fig. 2, which will close the snap in the manner described. For the purpose of actuating the rod 123 at the snapping-up position and at the ware detaching position we provide a cam 130 which is keyed to the main vertical power shaft 14, and which has a cam surface 131 extending around its upper edge. A cam roller 132 runs upon the cam surface 131 and is secured at one end of a lever 133 secured to a rock shaft 134 which is carried in brackets 135 which depend from the underside of the stationary top plate 3. The rock shaft 134 also carries two striking arms 136 and 137. The striking arm 136 operates the snap which is at the snapping-up or ware attaching position, and the arm 137 operates the snap which is at the ware detaching position. Both of these operations take place by the engagement of the outer ends of the arms 136 and 137 with projections 138 on collars 139 secured to the lower ends of vertical

operating rods 140, one of which is provided for each of the snap devices. Each rod 140 extends slidably through bearings 141 and 142 carried by the rotating plate 7 and carries rigidly at its upper end a sleeve 143 having an arm 144 which has an opening to receive the upper end of the rod 123. The striking block 125 which is carried by the rod 123 is so adjusted that when the rod 140 is moved down the arm 144 strikes the block 125 before the rod 140 completes its downward movement and thereby pushes down the rods 123 and 108 to open the snap. A spring 145 surrounds the rod 140 within the bearing 142 and acts to return the rod 140 and the arm 144 to their upper position as soon as the rod is released by the striking arm 136 or 137.

A weight 146 is secured to the arm 133 in order to keep the roller 132 in engagement with the cam surface 131 of the cam 130.

Fig. 2 shows two of the snap devices, one in section and the other in elevation. The device in section is at the ware attaching position, and the device in elevation is at the ware discharging position, where it happens to be directly behind the rod 140 which is at its discharge position. To avoid confusion it should be noted that the rod 140 shown in Fig. 2 is not associated with the ware holder directly behind it, but with the ware holder shown at its right at the side of this figure.

In the operation of the snap device described above, the shaft 14 rotates once for each forward step of the machine, and in so rotating carries with it the cam 130 which operates through the roller 132 and the arm 133 to rock the shaft 134 during the interval between the step-by-step movements of the plate 7 which carries the ware holders. This movement of the rock shaft 134 causes the striking arms 136 and 137 to engage the projections 138 associated with the ware holders which, at the moment, are in the ware attaching and ware detaching positions, and draws down the two arms 140 at the attaching and detaching positions, thereby causing the arms 144 to strike the block 125 and lower the rods 123 and 108. The fingers 105 are thereby moved from the closed position of Fig. 2 to the open position of Fig. 3. At this time the cam 45 operates through the connections described to raise the head 40 and place the nappy N in position with its flange ready to be gripped by the fingers 105. At the same time the opening of the snap at the discharge position releases the finished article which has been brought to that position, and this article is removed by any suitable means. The continued rotation of the cam 130 quickly raises the striking arms 136 and 137, and the springs 145 raise the rods 140 and release the blocks 125, whereupon the springs 113 raise the rods 108 and close the fingers 105 upon the nappy which has been placed in the attaching position, as stated above. At the same time the fingers 105 of the snap at the discharge position are also closed. These operations are repeated in each interval between the step-by-step movement of the ware holders.

We have shown in the accompanying drawing the form in which we now prefer to construct our invention, but it is to be understood that various changes in the arrangement and construction of parts may be made without departing from our invention, which is limited only by the scope of the appended claims.

We claim as our invention:

1. Apparatus for fire polishing and finishing glassware comprising a ware-receiving station, a fire-polishing station, a finishing station, and a ware-removing station, a ware-holding snap, means for automatically presenting ware to said support and for causing said snap to grasp the ware, means for moving the said snap to the said fire-polishing, finishing and removing stations successively, and means for automatically detaching the said ware from the said snap at the said ware-removing station.

2. Apparatus for fire-polishing and finishing glassware comprising a ware-receiving station, a plurality of fire-polishing stations, a finishing station, and a ware-removing station, a rotatable carrier, a plurality of ware-holding snaps carried by said carrier, means for automatically attaching the ware to said snaps at the said ware-receiving station, means for intermittently rotating the said carrier to bring the ware to the said fire-polishing, finishing and ware-discharging stations successively, and means for automatically detaching the said ware from the said snaps at the said ware-removing station.

3. Apparatus for fire-polishing and finishing glassware comprising a carrier, a circular series of vertical and individual punties carried by said carrier, a snap carried at the lower end of each of said punties, means for imparting a step-by-step rotation to the said carrier, means automatically operable during the intervals between the said movements of the carrier for causing two of the said snaps to open to receive and discharge glassware respectively, and means for fire-polishing and finishing the ware carried by the snaps of the remaining punties.

4. The combination with a fire-polishing machine, of a ware-holder, a snap carried by said ware-holder, automatically operable means for opening and closing said snap, and means for presenting ware to the said snap comprising a ware support and means for raising and lowering the said support.

5. The combination with a fire-polishing machine, of a series of ware-holders, snaps

carried by the said ware-holders, means for presenting ware to the said snaps successively, and means for successively bringing the said ware-holders above the said ware-presenting means, the said ware-presenting means comprising a ware-support and means for raising and lowering the said support.

6. The combination with a fire-polishing machine, of a circular series of vertical punties, means for bringing the said punties successively to a ware-receiving position, ware-holding snaps carried by the said punties, and means at said ware-receiving position for presenting the ware to the said snaps comprising a ware-support, and means for raising and lowering the said support in the intervals between the movements of the said punties.

7. The combination with a fire-polishing machine, of a circular series of vertical punties, means for bringing the said punties successively to a ware-receiving position, a plurality of fire-polishing positions, a finishing position, and a ware-detaching position, and a ware-holding snap device carried by each of said punties, the said snap device comprising a hollow head, gripping fingers extending therefrom. and means operable within the said head for opening and closing the said fingers.

8. The combination with a fire-polishing machine, of a circular series of vertical punties, means for bringing the said punties successively to a ware-receiving position, a plurality of fire-polishing positions, a finishing position, and a ware-detaching position, and a ware-holding snap device carried by each of said punties, the said snap device comprising a hollow head, gripping fingers extending therefrom, and means slidable within the said head and engaging the said fingers to move the said fingers to open and closed positions.

9. The combination with a fire-polishing machine, of a circular series of vertical punties, means for bringing the said punties successively to a ware-receiving position, a plurality of fire-polishing positions, a finishing position and a ware-detaching position, and a ware-holding snap device carried by each of said punties, the said snap device comprising a tubular support, a hollow head carried thereby, gripping fingers extending from the said head and a rod slidable within the said tubular support and carrying means for engaging the said fingers and for moving the said fingers to open and closed positions.

10. The combination with a fire-polishing machine, of a circular series of vertical punties, means for bringing the said punties successively to a ware-receiving position, a plurality of fire-polishing positions, a finishing position, and a ware-detaching position, and a ware-holding snap device carried by each of said punties, the said snap device comprising a vertical tubular support, a hollow head secured to the lower end of the said tubular support, gripping fingers extending from the said head, and a rod vertically slidable within the said tubular support and carrying means for engaging the said fingers and for moving the said finegrs to open and closed positions.

11. The combination with a fire-polishing machine, of a circular series of vertical punties, means for bringing the said punties successively to a ware-receiving position, a plurality of fire-polishing positions, a finishing position, and a ware-detaching position, and a ware-holding snap device carried by each of said punties, the said snap device comprising a tubular support, a hollow head secured to the end of the said support and having an internal flange formed around its lower open end, gripping fingers supported upon the said flange and extending beyond the said head, a rod slidably contained in the said tubular support and means carried by the said rod for engaging the said gripping fingers and moving them into open and closed positions.

12. The combination with a fire-polishing machine, of a circular series of vertical punties, means for bringing the said punties successively to a ware-receiving position, a plurality of fire-polishing positions, a finishing position, and a ware-detaching position, and a ware-holding snap device carried by each of said punties, the said snap device comprising a tubular support, a hollow head secured to the end of the said support and having an internal flange formed around its lower open end, gripping fingers supported upon the said flange and extending beyond the said head, the said fingers having inwardly extending projections, a rod slidably contained within the said tubular support, and a head carried by the said rod and having an annular recess adapted to receive the said projections.

13. The combination with a fire-polishing machine, of a circular series of vertical punties, means for bringing the said punties successively to a ware-receiving position, a plurality of fire-polishing positions, a finishing position, and a ware-detaching position, and a ware-holding snap device carried by each of said punties, the said snap device comprising a tubular support, a hollow head secured to the end of the said support and having an internal flange formed around its open end, gripping fingers supported upon the said flange and extending beyond the said head, the said fingers having inwardly extending projections and also having other projections adjacent to the said flange, a rod slidably contained within the said tubular support, and a head carried by the said rod and provided with an annular recess for receiving the said inward pro-

jections of the said gripping fingers, the said recess having a conical portion for forcing the said fingers into gripping position, and an abrupt portion for forcing the said fingers into open position.

14. The combination with a fire-polishing machine, of a circular series of vertical punties, means for bringing the said punties successively to a ware-receiving position, a plurality of fire-polishing positions, a finishing position, and a ware-detaching position, and a ware-holding snap device carried by each of said punties, the said snap device comprising a tubular support, a head carried by the said support, gripping fingers extending from the said support, a rod slidably contained within the said tubular support and provided with means for operating the said gripping fingers, and a spring within the said support and surrounding the said rod, the said spring tending to cause the said rod to move the said gripping fingers into their closed or gripping position.

15. The combination with a fire-polishing machine, of a circular series of vertical punties, means for bringing the said punties successively to a ware-receiving position, a plurality of fire-polishing positions, a finishing position, and a ware-detaching position, and a ware-holding snap device carried by each of said punties, the said snap device comprising a tubular support, a head carried by the said support, gripping fingers extending from the said support, a rod slidably contained within the said tubular support and provided with means for operating the said gripping fingers, the said support having a reduced portion forming a spring seat, a sleeve surrounding the said rod within the said tubular support, and a spring confined between the said sleeve and the said depression.

16. The combination with a fire-polishing machine, of a circular series of vertical punties, means for bringing the said punties successively to a ware-receiving position, a plurality of fire-polishing positions, a finishing position, and a ware-detaching position, and a ware-holding snap device carried by each of said punties, the said snap device comprising a tubular support, a head carried by the said support, gripping fingers extending from the said support, a rod slidably contained within the said tubular support and provided with means for operating the said gripping fingers, the said support having a reduced portion forming a spring seat, a sleeve surrounding the said rod within the said tubular support, a spring confined between the said sleeve and the said depression, a second rod disposed in line with the end of the said first-named rod and forming a continuation thereof, and a striking block adjustably secured to the said second rod.

17. The combination with a fire-polishing machine, of a circular series of vertical punties, means for bringing the said punties successively to a ware-receiving position, a plurality of fire-polishing positions, a finishing position, and a ware-detaching position, and a ware-holding snap device carried by each of said punties, the said snap device comprising a hollow support, anti-friction bearings carried by the said support, a hollow shaft mounted for rotation in the said bearings, a chuck secured to the said shaft, a tubular snap support secured in the said chuck and extending into the said hollow shaft, a head secured to the projecting end of the said snap support, gripping fingers extending from the said head, a rod slidably contained within the said snap support and provided with means for moving the said fingers into open and closed positions, a sleeve carried by the said rod within the said tubular snap support, a spring surrounding the said rod and confined between the said sleeve and a reduced portion of the said tubular snap support, a second rod extending through the said hollow shaft into engagement with the said first rod, and forming a continuation thereof, and a striking block adjustably secured to the said second rod.

18. The combination with a fire-polishing machine, of a circular series of vertical punties, means for bringing the said punties successively to a ware-receiving position, a plurality of fire-polishing positions, a finishing position, and a ware-detaching position, and a ware-holding snap device carried by each of said punties, the said snap device comprising gripping fingers, a vertical reciprocable rod provided with means for moving the said fingers into open and closed positions, a spring tending to hold the said rod in raised position and means for depressing the said rod comprising a continuously rotating cam, a striking arm reciprocated by the said cam, an operating rod spaced from the said gripper-actuating rod, a collar on the said operating rod for engagement by the said striking arm, and an arm carried by the said operating arm and in operative relation to the said gripper-actuating rod.

19. A glass working machine comprising a plurality of vertical snap supports, a set of gripping fingers carried by each of the said supports, vertically movable rods adapted to actuate the said fingers, and means for automatically operating the said rods at a ware-receiving position and at a ware-discharging position, the said actuating means comprising a rotatable cam, a rock shaft, a lever operable by the said cam to rock the said shaft, two striking arms carried by the said shaft, an operating rod associated with each of the said gripper

actuating rods, a member carried by each of the said operating rods and adapted to be engaged by the said striking arms when in the ware-receiving and ware-discharging positions, and means for operatively connecting the said operating rods to move the said gripper actuating rods.

20. A glass working machine comprising a plurality of vertical tubular snap supports, chucks for rotatably holding the said tubular supports, vertical rods contained within the said tubular supports, heads secured to the lower ends of the said supports, gripping fingers extending from the said heads, means extending from the said rods for actuating the said fingers, springs contained within the said tubular supports and tending to hold the said actuating rods in their upper positions, and means for simultaneously depressing the said rods at a ware-receiving position and at the ware-discharging position, the said depressing means comprising an arm in operative relation to each of the said actuating rods, a vertical operating rod carrying the said arm, a spring tending to maintain the said arm in its raised position, a collar carried by the said operating rod, a rock shaft, striking arms carried by the said rock shaft and adapted to engage the collars on the said operating rods at the ware-receiving and ware-discharging positions, a lever also carried by the said rock shaft, a cam roller carried by the said lever, and a continuously rotating cam engaging the said roller.

In testimony whereof we the said ANDREW J. SANFORD and JOHN B. TOWNSEND have hereunto set our hands.

ANDREW J. SANFORD.
JOHN B. TOWNSEND.