

March 23, 1926.

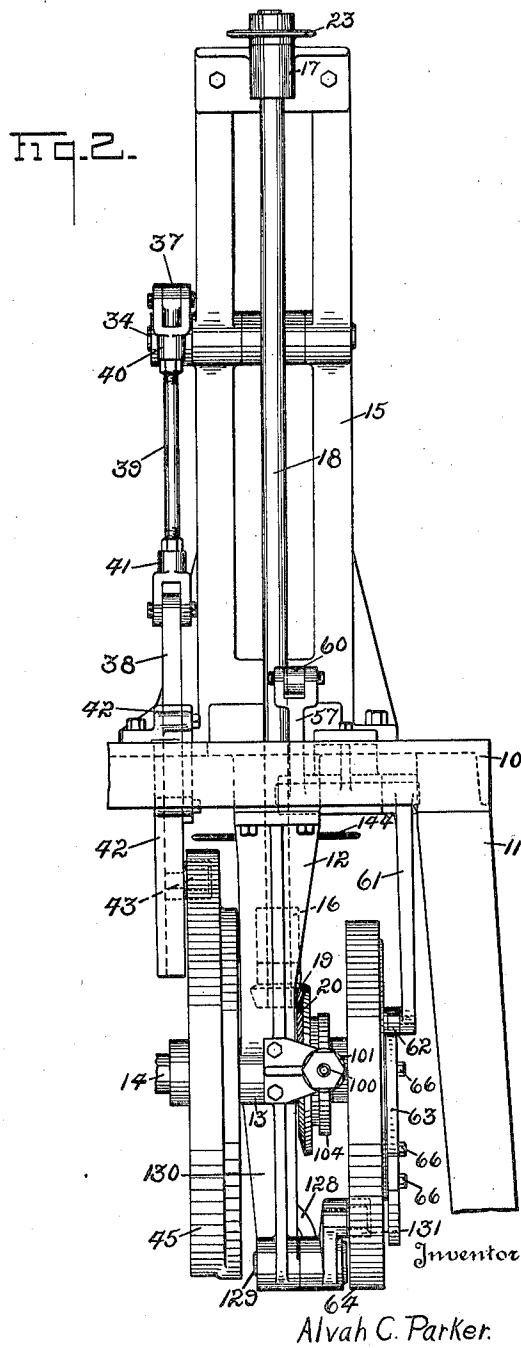
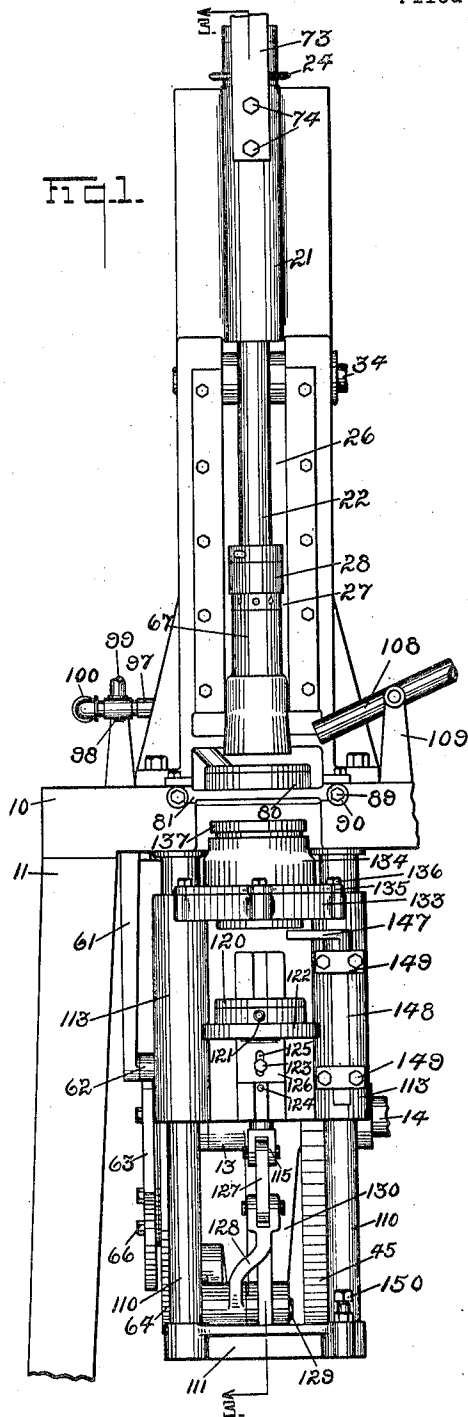
1,577,655

A. C. PARKER

METHOD OF AND APPARATUS FOR BURNING-OFF GLASSWARE

Filed May 16, 1924

3 Sheets-Sheet 1



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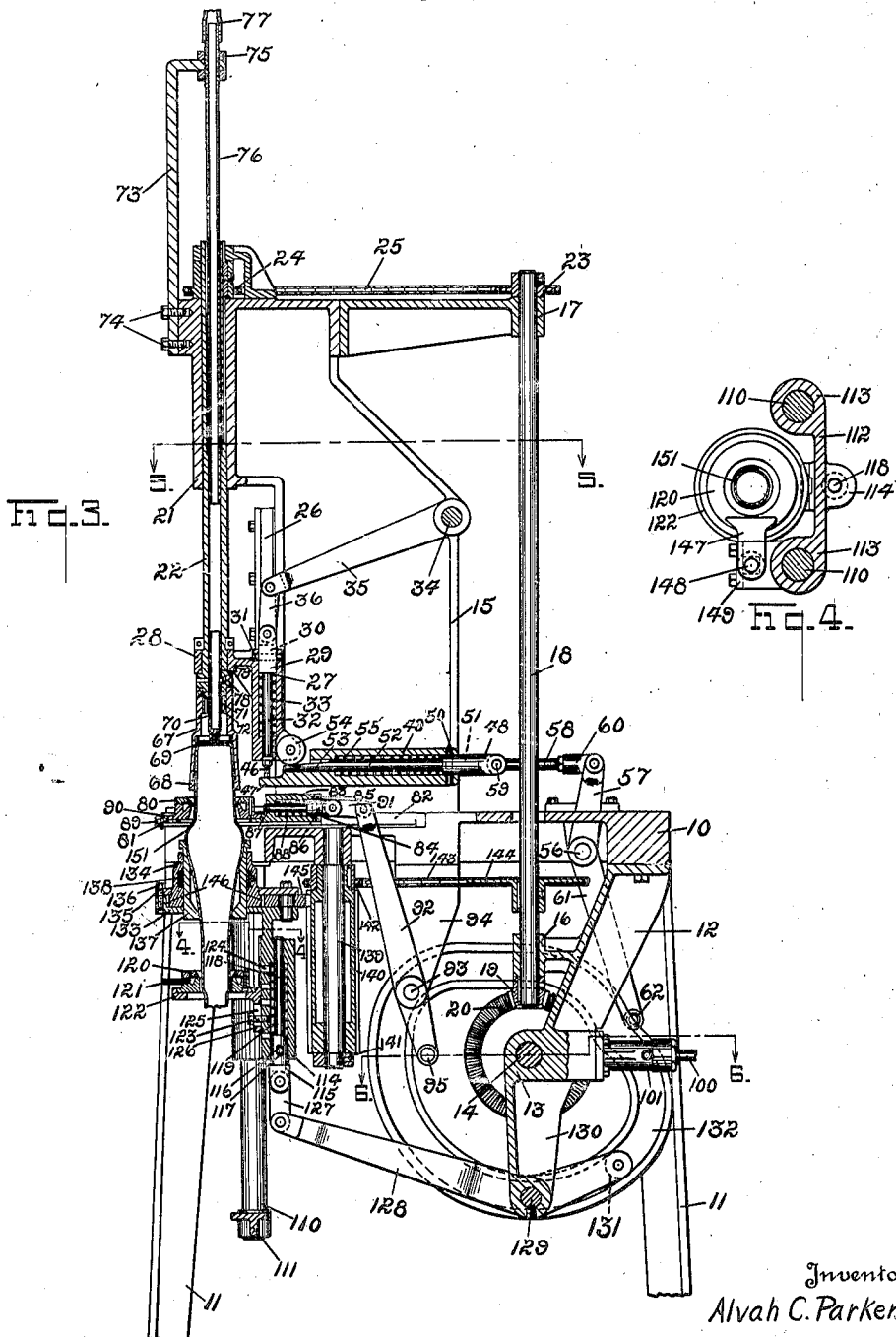
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METHOD OF AND APPARATUS FOR BURNING-OFF GLASSWARE

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3 Sheets-Sheet 3

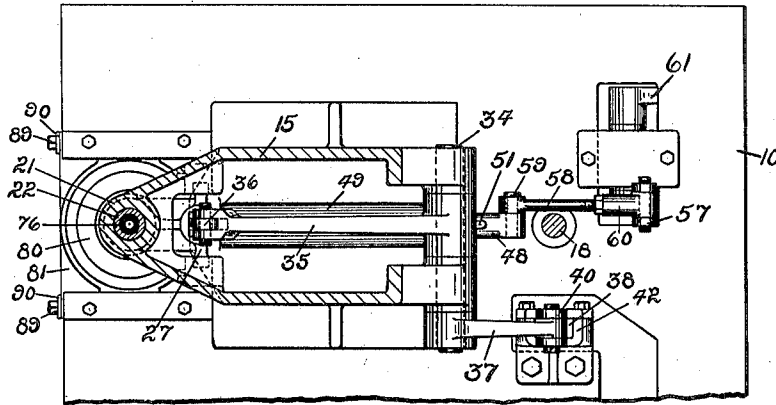


Fig. 5.

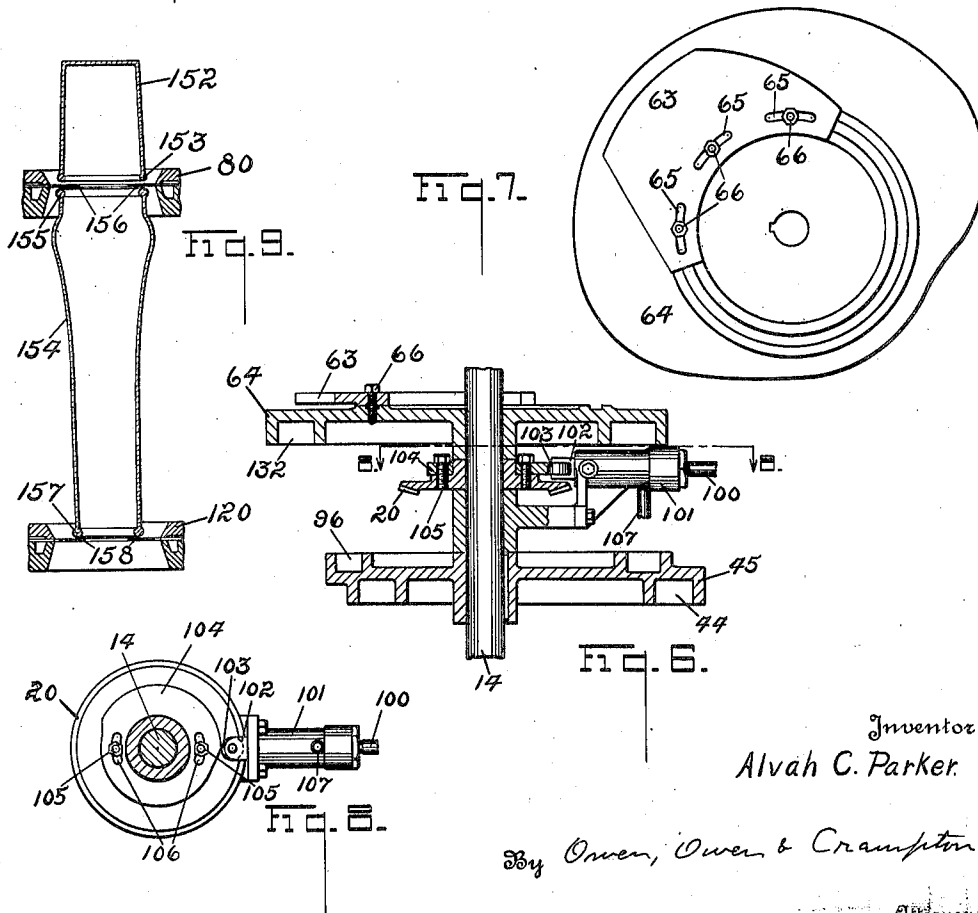


Fig. 7.

Fig. 8.

Fig. 6.

Fig. 9.

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Patented Mar. 23, 1926.

1,577,655

UNITED STATES PATENT OFFICE.

ALVAH C. PARKER, OF TOLEDO, OHIO, ASSIGNOR TO THE LIBBEY GLASS MANUFACTURING COMPANY, A CORPORATION OF OHIO.

METHOD OF AND APPARATUS FOR BURNING OFF GLASSWARE.

Application filed May 16, 1924. Serial No. 713,709.

To all whom it may concern:

Be it known that I, ALVAH C. PARKER, a citizen of the United States, and a resident of Toledo, in the county of Lucas and State of Ohio, have invented a new and useful Method of and Apparatus for Burning Off Glassware, which invention is fully set forth in the following specification.

My invention relates to a method of and apparatus for burning-off glassware and more particularly for severing and finishing a blown blank comprising both a tumbler and lamp chimney.

The object of my invention is to provide a method of and apparatus for severing glassware by burning-off and at the same time finishing the severed edge in the desired manner. Other objects of the invention will appear as the description proceeds.

In the accompanying drawings, Figure 1 is a front elevation of apparatus embodying my invention; Fig. 2 is a rear elevation of the same; Fig. 3 is a vertical section on the line 3—3 of Fig. 1; Figs. 4, 5 and 6 are sections on the lines 4—4, 5—5 and 6—6, respectively, of Fig. 3; Fig. 7 is an elevation of a cam; Fig. 8 is a section on the line 8—8 of Fig. 6; Fig. 9 is a diagrammatic view of the bead-forming step.

My apparatus is shown mounted on a table 10 having legs 11. A bracket 12 is attached to the under side of the table and carries a bearing 13 for a main shaft 14. Devices for treating a number of articles simultaneously are positioned side by side on the table and may be controlled by the same drive shaft 14, but, as such devices are duplicates of each other, only one is shown and described.

A standard 15 rises from the upper surface of the table. The bracket 12 has a bearing 16 directly above bearing 13, and standard 15 has a bearing 17 in line with bearing 16. A vertical shaft 18 is mounted in bearings 16 and 17 and is driven by a bevel-gear 19 in mesh with a gear 20 on shaft 14. Upon the front side of standard 15 there is a bearing 21 for a sleeve 22. A sprocket wheel 23 on the upper end of the shaft 18 is connected to a sprocket wheel 24 by a sprocket chain 25. The sprocket wheel 24 is keyed upon sleeve 22 so that the sleeve may be reciprocated vertically through the sprocket wheel while being rotated thereby.

Below bearing 21 on the front side of standard 15, there is a guideway 26 in which there is mounted a slide 27. Slide 27 has a collar 28 surrounding sleeve 22, and by means of this connection slide 27 controls the vertical position of the sleeve. A block 29 is mounted within a bore in slide 27 and has a slot 30 through which there projects a pin 31. A rod 32 extends downward from block 29 and is surrounded by a spring 33.

A rock shaft 34 is mounted on standard 15 and has an arm 35 connected by a link 36 to block 29. Another arm 37 extending from rock shaft 34 is connected to a slide 38 by a link 39 having adjustable connections 40 and 41 with arm 37 and slide 38, respectively. Slide 38 reciprocates vertically within a guideway 42 mounted on the table, and is actuated by a cam roller 43 working within a cam groove 44 in a cam wheel 45 mounted on main shaft 14. A set screw 46 projects downward an adjustable distance below the lower side of slide 27 in position to contact a lug 47 projecting from a suitable fixed portion of the apparatus.

A block 48 is retained within a guideway 49 by means of a pin 50 extending through a slot 51 in block 48. A rod 52 extends from block 48 and has a wedging portion 53 at its front end adapted to pass beneath a roller 54 mounted on the lower end of slide 27. A spring 55 surrounding rod 52 presses block 48 to the rearward or to the right, as viewed in Fig. 3. A rock shaft 56 is suitably mounted on the table, and has an arm 57 connected by link 58 to a pivot 59 in block 48. Link 58 is connected to arm 57 by an adjustable connection 60. Rock shaft 56 has another arm 61 carrying a cam roller 62 in position to be actuated by a cam plate 63 attached to a cam wheel 64 mounted on main shaft 14. Cam plate 63 has therein a plurality of arcuate slots through which there project from the cam wheel bolts 66, so that the plate may be fixed in adjusted position upon the cam wheel.

Sleeve 22 carries at its lower end a chuck 67. The chuck may be of any desirable construction, but, as shown, has a centering ring 68 at its lower end. There is provided within the upper end of the chuck a plate 69 adapted to contact the end of an article

placed within the chuck. Plate 69 is carried by a tubular stem 70 projecting upward into the bore of sleeve 22. Stem 70 is surrounded by a collar 71 provided with air ducts 72. A vertical arm 73 is attached to the front of standard 15 by means of set screws 74. Nuts 75 hold a pipe 76 in adjusted position on arm 73. Pipe 76 extends downward into sleeve 22. A hose 77 leads from the upper end of pipe 76 to any desired means for exhausting air from the chuck. Plate 69 is retained in the chuck by a set screw 78 passing through sleeve 22 into a slot 79 in stem 70. The plate 69 is perforated, and the vacuum effect of tube 76 may act through these perforations to retain an article in the chuck.

An annular burner 80 is mounted upon a slide 81 sliding within a guideway 82 on the table. A hollow guide block 83 is provided on the upper side of slide 81, and within this guide block there is mounted a slide block 84. Slide block 84 is retained in position within the guide block by means of a pin 85 passing through a slot 86 in the slide block. From the forward end of the slide block there projects a rod 87 surrounded by a spring 88, which normally keeps the slide block pressed back so that the pin is at the forward limit of the slot.

The forward movement of slide 81 in guideway 82 is limited by means of set screws 89 surrounded by washers 90 which project into the path of the slide. Slide block 84 is connected by means of a link 91 to a lever 92 fulcrumed at 93 upon a bracket 94 extending downward from the table. The lower end of lever 92 is provided with a cam roller 95 adapted to work within a cam groove 96 in cam wheel 45, cam groove 96 being in the opposite side of the cam wheel from groove 44.

The burner is shown connected by means of a flexible hose 97 to a connection 98 from which there lead pipes 99 and 100. Pipe 99 leads from any suitable source of fuel, not shown, while pipe 100 leads from a valve casing 101. The openings within the valve casing 101 are controlled by a valve stem 102 carrying a cam roller 103 in contact with a cam plate 104 fixed upon gear 20 by means of bolts 105 passing through arcuate slots 106. A pipe 107 leads from any suitable source of gas to the valve casing 101. A burner 108 is mounted upon a bracket 109 in position to direct a flame against the lower end of chuck 67 when the chuck is in its lower position.

Guide rods 110 project downward from table 10 and are connected at their lower ends by a cross-piece 111. A slide 112 has ears 113 projecting from its sides and surrounding guide rods 110. Upon the rear of slide 112 there is a guide block 114 within which there is mounted a slide block 115

by means of a pin 116 passing through a slot 117 in the slide block. A rod 118 projects upward from slide block 115 and is surrounded by a spring 119, which normally maintains the pin at the upper end of the slot.

A burner 120 is positioned in alignment with the chuck and with the forward position of burner 80, and is supplied with fuel from any suitable source through a pipe 121. The burner is supported upon a carrier 122 attached to slide 112, by means of a set screw 123. Set screw 123 may enter any one of a series of holes 124 in slide 112, and it passes through a slot 125 in a lug 126 on carrier 122.

Slide block 115 is connected by a link 127 to an arm of a lever 128 fulcrumed at 129 on a downward extension 130 from bracket 12. The other end of lever 128 carries a cam roller 131 adapted to work within a cam groove 132 in the opposite face of wheel 64 from cam plate 63.

Upon the upper end of the slide 112, there is formed a chuck-carrying bracket 133. A chuck carrier 134 is attached to this bracket by means of a ring plate 135 secured in position by screws 136. A chuck 137 is mounted within the chuck carrier 134 and is held in adjusted position within the chuck carrier by means of a friction ring 138. A stub shaft 139 projects downward from the table immediately behind slide 112 and carries an elongated gear 140 secured in position by means of a collar 141. Upon the upper end of gear 140 there is fixed a sprocket wheel 142 connected by chain 143 to a sprocket wheel 144 upon shaft 18. An idler gear 145, upon the upper end of the slide 112, is in mesh with gear teeth 146 on the chuck carrier and with gear 140, so that by this means chuck 137 is rotated from shaft 18 in unison with chuck 67.

Beneath the chuck carrier upon slide 112, there is a stop 147. Stop 147 has a downwardly extending square portion 148 which slides through brackets on an ear 113. This square portion 148 is held in position by keepers 149. A set screw 150 is mounted upon cross-piece 111 in position to contact the bottom end of square portion 148 and limit the descent of stop plate 147.

The operation of the apparatus is substantially as follows:

Beginning with the parts in the position in which they are shown in Fig. 3, a blown blank 151 is mounted in the chucks in burning-off position. The blank is rotated by means of the rotation of the chucks and is subjected to flames from the annular burners 80 and 120. At the same time chuck 67 is heated, and the flame from the burner 108 may be so directed that it will contact the article between the chuck 67 and the burner 80, if this is found necessary. One or more

burners, not shown, may be provided, if desired, to heat the article between the burners 80 and 120.

The burners may be supplied with fuel in any desired manner, but I prefer to use a constant flow of gas supplemented by an intermittent flow of oxygen. As indicated in the drawings, valve casing 101 is connected by pipe 100 to burner 80. Another pipe may be provided connecting the same valve to burner 120, or separate valves may be provided for controlling the two burners. I prefer to supply the burners with oxygen through such additional valve-controlled pipes, so that an intense flame created by the mixture of oxygen and fuel gases may be used only during the burning-off process, and a flame resulting from the burning of the fuel gases in the atmosphere may be continued between successive burning-off operations.

After the flame has been continued long enough to melt the walls of the article opposite the burners, wedge 53 is driven under roller 54 by the action of cam plate 63, and chuck 67 is thereby raised against the action of spring 33. When the chuck is thus raised, it carries the burned-off tumbler 152 to a position slightly above the plane of the flame, as shown diagrammatically in Fig. 9, and chuck 67 is maintained in this position until edge 153 of the tumbler is properly finished.

In the meantime, the chimney portion 154 of blank 151 remains at the same elevation with respect to the burners that it was during the initial period of burning-off. The molten glass on the end 155 of the chimney next to the burner 80 is drawn by surface tension into a bead, and the melting will continue until the glass is drawn down a slight distance below the flame 156 of burner 80. For this reason, the bead formed on edge 155 will be larger than the bead on edge 153. During the same time, the molten glass on the lower edge 157 of the chimney will be drawn up by surface tension from the plane of the flame 158 of burner 120 and will form a bead of substantially the same size as that at the upper end of the chimney. Ordinarily, it is not considered desirable to have too heavy a bead on the edge of a tumbler, but a comparatively heavy bead on the edge of a lamp chimney is highly desirable.

For most effective work, an extremely thin, sharp flame is used. Fine adjustment of the time during which the article remains in the chuck is not necessary because, with such a thin, sharp flame, the size of the bead will be limited by the drawing of the glass away from the flame, as the flame will not continue to melt the glass after a slight withdrawal. However, the cam plate governing the oxygen controlling valve

may be adjusted so as to limit the duration of the intense flame to substantially the necessary time.

After the article is properly severed and the severed edges are finished as desired, 70 valve stem 102 will be moved to shut off the oxygen. Chuck 67 with tumbler 152 is then raised and slide 112 carrying chuck 137 and chimney 154 is lowered. When the slide approaches its lowest position, stop 147 is 75 arrested by set screw 150 and in turn stops the descent of chuck 147, thereby raising the chuck with respect to its carrier. In the meantime, lever 92 has withdrawn burner 80 from alignment with the chucks, so 80 that it does not interfere with loading and unloading. The operative then removes the tumbler and chimney and positions another blank within chuck 137. Thereafter, burner 80 is returned to alignment with the 85 chucks, and chuck 137 is raised and chuck 67 is lowered.

When the end of burner-carrying slide 81 contacts stop-washers 90, the burner is stopped in exact alignment with the chucks. 90 Slide block 84 may continue to advance slightly, compressing spring 88, so that proper positioning of the burner does not depend upon the accuracy of the positioning of slide-block 84. In like manner, slide 95 112 is stopped by contact with the underside of the table, and burner 120 is adjusted on the slide so that it will be the desired distance below burner 80. Slide block 115 may continue upward slightly, com- 100 pressing spring 119, after the carrier slide is stopped. The lowering of chuck 67 is stopped by set screw 46 and stop 47, and spring 33 allows exact adjustment by set screw 46. In this way the positioning of 105 the slides may be accurately controlled, and the elevations of chuck 67 and burner 120 may be exactly adjusted without adjusting the cam or operating connections, and without regard to the exact shape of 110 the cam tracks or the exact play in the joints of the connecting means, etc.

The preferable timing is such that slide 112 reaches its highest point slightly before chuck 67 reaches its lowest point. As chuck 115 67 approaches its lowest point, it contacts the upper end of blank 151 and forces the blank downward, chuck 137 sliding downward through friction ring 138.

This provision for movement of chuck 120 137 with respect to its carrier takes care of any slight variation in successive blanks. By limiting the position of the blank in accordance with the position of chuck 67, all of the successive tumblers will be precisely 125 the same length, and the length of the chimney, which is determined by the distance apart of burners 80 and 120, is likewise the same for each successive article treated.

Various departures from the specific dis- 130

closure may be made within the scope of the appended claims without departing from the spirit of the invention.

What I claim is:

1. In a glass severing device, a chuck, a burner in position to apply a melting-off flame to a glass article in the chuck, automatic means to vary the intensity of the flame, and synchronized automatic means for moving the chuck a slight distance away from the burner at a predetermined time during a period of intensified flame.
2. In glass severing apparatus, a melting-off burner, a chuck, automatic means for moving the chuck away from and towards the burner for loading purposes, and synchronized automatic means for moving the chuck independently of the first said means a slight distance away from the burner.
3. In a glass severing apparatus, a melting-off burner, a chuck, yielding means for moving the chuck towards and from the burner, and a wedge adapted to force the chuck away from the burner against said yielding means.
4. In apparatus for melting-off glassware, a rotary chuck, means to reciprocate the chuck longitudinally of its axis; an annular burner, and means to reciprocate the burner transversely of its axis into and out of alignment with said chuck.
5. In apparatus for melting-off glassware, a vertically reciprocable chuck mounted to rotate about a vertical axis, a melting-off burner adapted to melt-off a glass article in said chuck, and means to reciprocate the burner horizontally into and out of operative relation with the chuck.
6. In apparatus for melting-off glassware, an annular melting-off burner, a slide carrying the burner, a horizontal guideway for the slide, and means to hold an article of glassware in operative relation with the burner when the burner-carrying slide is in one extreme position.
7. In apparatus for melting-off glassware, a burner-carrying slide, yielding means for reciprocating the slide, a stop limiting the movement of the slide in one direction, and means for positioning an article of glassware in operative relation with the burner when the slide is against the stop.
8. In apparatus for melting-off glassware, an annular burner, a chuck beneath the burner, a chuck-carrying slide beneath the burner, friction means yieldingly resisting relative vertical movement of the chuck and slide, means to vertically reciprocate the slide, a stop limiting the descent of the chuck, and means above the burner to determine the elevation of an article carried by the chuck.
9. In apparatus for melting-off glassware, two annular burners in axial alignment, a chuck beneath the burner, a chuck on the side of one burner distant from the other burner, and means to rotate the two chucks in unison.
10. In apparatus for melting-off glassware, two annular burners in axial alignment, two chucks in axial alignment with the burners and adapted to hold an article of glassware in operative relation to the two burners, means for rotating the chucks in unison, and separate means for moving each chuck longitudinally of its axis.
11. The process of melting-off glassware which consists in applying a sharp, thin flame to a glass article, the flame being of sufficient intensity to quickly sever the glass, and continuing the application of said flame after severance with as great intensity until the severed edge is melted and surface tension withdraws it from melting relation with the flame.
12. The process of melting-off glassware which consists in presenting an article of glassware to a sharp, thin flame, continuing one of the severed edges after severance in the same relation to the flame until it is withdrawn by surface tension of the molten glass, and withdrawing the other severed edge a slight distance from the flame immediately after severance.
13. The process of making glassware which consists in blowing a blank comprising a portion which will form a tumbler, a portion which will form a chimney and a moil portion, presenting the blown blank to two flames contacting the glass at the line of division between the chimney blank and the moil and between the chimney blank and the tumbler, respectively, and thereby simultaneously severing the blank along the two lines, withdrawing the tumbler a slight distance from the flame immediately after severance to fire-finish the edge, and maintaining the chimney between the flames until the severed edges are withdrawn from melting relation with the flames by surface tension.

In testimony whereof I have hereunto subscribed my name to this specification.

ALVAH C. PARKER.